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INVENTORY PRACTICE
AND
MATERIAL CONTROL

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INVENTORY PRACTICE
AND
MATERIAL CONTROL

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PREFACE

Within a period of ten years the subject of inventories has risen from one of minor to one of primary importance. The direct and contributory causes are many, but to two of them is due the greater part of this advancement which places the problem of inventories on a par in importance with any other problem connected with either an industrial or a merchandising enterprise. The first cause is the income tax; the second, the tremendous increase in the investments in inventories.

The majority of concerns require an inventory in establishing taxable income. Hence it is particularly necessary that the inventory amount be correct, because overstating inventories result in overstated profits and overpayments of taxes; understating inventories means incorrect tax payments with whatever penalties attach thereto. Further, most concerns at the present time have the greater part of their working capital tied up in the inventory, an asset which is constantly subject to loss of value both by reason of market declines and obsolesence caused by changes in designs, styles, and the advancement of the art. This second feature makes it imperative that a positive and constant control of materials be maintained if such losses are to be avoided.

A discussion of inventories involves the consideration of many matters—matters arising not only during the course of obtaining the physical inventory for the annual or semiannual balance sheet, but also throughout the entire operating period in the attempt to exercise positive control over materials. It is with respect to the various features connected with a physical inventory that the first part of this book is devoted. The various and necessary operations required to be accomplished to bring about satisfactory results are discussed in detail from the planning of the inventory to its final tabulation in many standard and special forms.

In a previous book by the author applicable to the present subject, one criticism was directed to what the reviewer termed "the large amount of detail involved." It is true that there is

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a large amount of detail connected with obtaining a dependable physical inventory of any size—in fact a *very* large amount of detail. At the same time it is also true that most physical inventories are far from satisfactory. This condition is brought about no doubt because so few people appreciate the fact that the taking of a *real* physical inventory calls for the consideration of a vast number of details, each one of which must be carefully planned and accomplished if the results desired are to be secured in dependable form. In the chapters dealing with the physical inventory there are evidences of repetition which the author recognizes. Such repetition, while quite apparent if the entire subject is read at one time, makes for clearness in instances of specific reference, thus conserving the time of one making practical use of individual sections.

One of the most recently developed methods of inventory is the retail method of inventory which not only has been accepted and put in use by many retail concerns, but also has received the approval of the tax authorities in connection with income and profits taxes. With the possible exception of the Federal tax regulations very little has been published concerning this method. It is hoped that the chapters treating of the retail method will throw new light on the subject especially for those who desire both an elementary and an advanced treatment of the matter.

The section devoted to material control deals with the necessary procedures and practices which have for their goal (a), the reduction of inventories to the lowest point consistent with production and sales requirements; (b), the elimination of losses due to obsolete materials; and (c), minimizing as far as is practically possible losses incurred as a result of market fluctuations.

In connection with the control of material the first few chapters applicable to this subject are given over to a discussion of the procedures of purchasing, receiving, storing, issuing, and shipping, and the control of these same procedures by means of the material ledger—the pivotal point of a control system. The material ledger is taken up first and described. Following this each operation in the movement cycle of material is discussed in so far as its relation with the material ledger is concerned.

Although a great deal has been written on this subject of material control one of its objectives being that of eliminating the physical inventory—and in spite of the apparent progress made during recent years through the use of better store keeping and

control methods, few concerns have done away with the physical inventory. It is the author's opinion that the reason why so few concerns can use their material ledgers to obtain their inventory figures for balance sheet purposes is that most material control systems are incomplete from an *accounting* standpoint. It is hoped that the methods and forms given here in connection with material control will help to correct this deficiency.

The relation of inventories to income and profits taxes is an important one, deserving of special comment. In the chapter dealing with this subject the attempt has been made to trace its development through from the 1913 law to and including the 1924 law. Discussion concerning this development necessarily requires consideration not only of the law and regulations, but also of all decisions and special rulings appearing in the various cumulative bulletins published by the Government.

In the preparation of this book the author has secured from many sources much of the information presented here. In this connection he is especially indebted to the following: T. L. Blanke of the National Retail Dry Goods Association, Jay Iglauer of Halle Brothers, P. H. Phillips of the Associated Oil Company, Malcolm P. McNair, Harvard University, and S. G. Fell of the Western Electric Company.

Frederic W. Kilduff.

San Francisco, Cal.
January, 1925.

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PART I
INVENTORY

INVENTORY PRACTICE AND MATERIAL CONTROL

CHAPTER I

THE FUNCTION OF INVENTORY

Definition of Inventory.—The word *inventory* is used in many ways. Broadly it is used to describe any detailed list of real or personal property, such list showing with respect to each individual item, its description, the quantity thereof, the unit price, and the total amount. From a financial and commercial standpoint, however, the word *inventory* has but one generally accepted meaning—that merchandise which a concern holds in a status suitable for present sale together with that material which it is intended and expected will eventually be converted and offered for future sale. It is that material or merchandise which a concern purchases with the intention of selling, either in its purchased or converted condition, for the purpose of effecting profits.

The word *inventory* in its most commonly accepted sense is used to express either (*a*), a detailed listing of all merchandise or material, or (*b*), the total only of all merchandise or materials in terms of dollars. Whenever *inventory* is used to describe any property items other than merchandise or stock-in-trade, it should be qualified by the name of the property it is applicable to. For example the terms "inventory of machinery," "inventory of tools," and "inventory of buildings," should be used in referring either to the total amount or to a detailed list of these classes of property. Throughout this book the word *inventory*, standing unqualified, is used in its accepted financial and commercial sense.

Classes of Inventory.—The inventories of manufacturers fall into three principal classes, namely: raw materials, work-in-process, and finished product. Raw material is that material in a rough or raw condition upon which no labor has been directly expended to convert it into the part or element to be made there-

from; work-in-process is that part of the inventory which represents material upon which labor has been directly applied but which has not yet reached the stage of final completion as a salable article; finished product is that portion of the inventory representing completed merchandise available for sale. These three classes taken collectively are referred to many times as the inventory of *direct* material.

In many cases manufacturers include in their total inventory, the inventory of indirect materials or those supplies necessary for operating and maintaining the plant in an efficient condition. Where the manufacturing concern is of a reasonable size the inventory of indirect materials generally represents a considerable investment. Theoretically this portion of the inventory is a deferred charge to income and should not be included in the total inventory figure. But practically because of its usual large amount it is not shown as a deferred charge but as a separate item under current assets or under the classification of working and trading assets if such a classification is used in the balance sheet. The reason why it is not improper in many cases to show the inventory of indirect materials as a current asset is because such inventories will eventually find themselves just as quick, if not quicker, in future work-in-process as the inventory of raw material. Indirect supplies upon consumption are chargeable to work-in-process through the overhead account. So far as both going and liquidating values are concerned, indirect materials generally have the advantage over direct materials, especially raw material and work-in-process, and in many cases, finished merchandise.

The inventory of a jobber or retailer, with but few exceptions, falls into one principal class—merchandise available for immediate sale. There are no raw materials, no work-in-process. In the larger retail concerns, however, the latter statement is not true because such companies undertake the work of a manufacturer in certain lines, *i.e.*, buying raw materials and expending labor thereon to convert such materials into finished and salable articles.

Need for Inventories.—Inventories, whether they be obtained as a result of a physical counting or not, are needed for three principal purposes, namely:

1. Financial.
2. Manufacturing.
3. Sales.

1. *Financial.*—In those companies where the purchase, production, and sales of merchandise are income-producing factors, the two principal financial statements—the balance sheet and the income statement—cannot be completed without the inventory. The balance sheet, first of all, required the inventory in order to complete its current assets. With the current assets complete, total assets and net worth of the business can then be established. For the income statement, inventories are required both at the beginning and the end of the period for which profits or losses are to be calculated.

It has been said that inventories are current assets only to the extent that they are convertible within a *reasonable time* into cash and receivables. Exactly what a reasonable time may be depends upon many things, the principal one of which is the nature of the business. Material held by one concern for the period of a year may be good and serviceable material at the end of that time, and hence properly classified as a current asset. On the other hand, material held by another concern for the same period of time can hardly be classified in a similar manner, even with the greatest stretch of imagination. A reasonable time for one concern, therefore, is oftentimes an unreasonable period to another. Generally speaking, however, the entire inventory is taken into the balance sheet as a current asset.

In determining the amount of profit or loss during any given period by means of the income statement, an inventory is required both at the beginning and the end of the same period in order to establish the cost of goods sold. Commencing with the opening inventory there is added the total of all purchases during the period. The sum of these two amounts must be accounted for, and since the inventory at the *end* of the period accounts for a portion of such total, then the difference theoretically represents the cost of goods sold during the period. Thus gross profits are established.

Although in theory this difference may be said to represent the cost of goods sold, practically it represents *two* factors, the principal one being that of the above (cost of goods sold) and the other, inventory shrinkages and shortages—losses arising from lack of material control in storing, manufacturing, and merchandising. In practice it is the exceptional concern which maintains records permitting of the accurate separation between these two figures, which as one amount make up the total consumption of inventory

during the given period. As a result the following formula, with the term "purchases" used in its broadest sense, is generally the accepted method used to establish cost of goods sold:

(Opening Inventory + Purchases) − Closing Inventory = Cost of Goods Sold.

The more correct formula would read as follows:

(Opening Inventory + Purchases) − (Closing Inventory + Inventory Shrinkages) = Cost of Goods Sold.

If the amounts which represent the opening inventory, the purchases, and the closing inventory, are correct, the cost of goods sold should for all practical purposes be correct. Whether or not it is actually correct depends upon the control of inventories between the purchase and the sale thereof, and the method of treating all cost of inefficiencies as a part of the cost of goods sold.

For Federal and state income and profit taxes the inventory is naturally required in the determination of taxable income. As such income is established by means of the income statement above referred to, the remarks in connection therewith are also applicable in the instance of income taxes. An entire chapter discussing the subject of inventories in their relations to income taxes will be found in this book.

Other uses of the inventory for financial purposes include those of personal taxes, insurance, and inventory turnover. In connection with personal taxes it is important that the inventory at various locations in various states be known. Inventories being personal property are taxable under personal property tax laws. It is important in connection with insurance that the investment in inventories be at all times known in order to avoid either over- or underinsurance, and so far as inventory turnover is concerned, figures are available which allow the management to calculate the number of times that their stock of merchandise is being turned over during any given period.

2. *Manufacturing.*—While an inventory expressed in *dollars* is essential for financial purposes, it is not so essential for manufacturing purposes. What is essential is *quantity*, for the reason that uninterrupted production cannot continue unless it is known at all times exactly how much material is, and will be, available for use. Although it is sufficient for financial purposes to have a

book inventory monthly, and a physical inventory once or perhaps twice a year, this is not enough for manufacturing purposes. What is necessary is a record which will show at all times the quantity of each kind of material available—be that material raw, in process, or in a finished condition. From a production standpoint inventories must be maintained in a balanced condition. This means more than having on hand such quantities of each material as will meet the requirements of production promptly. It implies accomplishing the above with an inventory which represents no unnecessary investment in this kind of working capital. While it is often possible to enjoy an uninterrupted production program without a well-balanced inventory, actual losses incurred as a result thereof in addition to the risk of other possible losses through maintaining an excessive inventory, are too great to warrant a continuation of such a practice. Where materials are overstocked there is always the chance of (*a*), loss through physical depreciation and obsolescence and (*b*), loss of value which may arise as a result of unfavorable market conditions. To prevent, or at least to minimize as much as possible such losses, to keep the inventory investment at a low figure, and to prevent interruptions to production programs are the functions of a material control system. Methods, and forms in connection therewith are described in following chapters.

3. *Sales.*—The entire inventory does not necessarily interest the sales department. What this department is principally concerned about is that portion of the inventory in a finished or nearly finished condition. Such information must be readily available at all times if competition is to be successfully met, if delivery dates are to be dependable, if proper service is to be rendered to customers, if advertising is to be most effectively utilized, and if finished merchandise on hand at the plant, storehouses, and sales branches is to be kept at the lowest possible investment point consistent with proper service.

Importance of Accurate Inventories.—The importance of accurate inventories from the standpoint of both quantity and value is not generally appreciated. Nor is it generally appreciated that in the determination of profits of losses no other figure is more often "juggled" to bring about the desired results than is the inventory. Where it is possible by audit to verify to a very close degree the accuracy of all other factors used in arriving at the amount of profit or loss over a given period, this condition is

not attained in the instance of inventories. Unquestionably, the inventory figure is the most difficult to verify.

All other things being equal the accuracy of net profits is dependent on the accuracy of the inventory. This, of course, can be said about any other factor entering into the calculation of profits, but when it is considered that *two* inventory amounts—the opening inventory and the closing inventory—are involved in each calculation of the cost of goods sold, and that these amounts are usually so large when compared with other factors, the full force of the above remark will be appreciated. Thus, if an inventory figure is not correct, the amount of gross and net profit will not be correct, and not only will the profit for one period be affected, but the profit of the following period or periods. The reason for this is that the closing inventory of one period is the opening inventory of the following period. Thus, if an incorrect inventory figure is used in one period, it will be used incorrectly in the next period.

For example, should the inventory at the end of 1924 be taken at too high a figure, the profits for that year, all other things being equal, will be too great by the amount of the excessive valuation. This is brought about in accounting for all materials chargeable to the period (the opening inventory at the beginning of 1924 plus purchases in 1924). As the closing inventory in this instance exceeds the correct inventory then the cost of goods sold during 1924 will necessarily be too small a figure (see formula above). Subtracting the incorrect cost of goods sold figure from net sales gives an excessive and incorrect figure of gross profits. Again, charging this excessive closing inventory for 1924 into 1925 as the latter's opening inventory results in making the cost of goods sold in 1925 show greater than it should, and gross profits for 1925 correspondingly smaller. *Understating* the closing inventory for 1924 will bring about the exact opposite results both for 1924 and 1925.

EXAMPLE WITH CORRECT INVENTORY FIGURES

1924	
Opening Inventory (Jan. 1, 1924)	$100,000
Purchases during 1924	500,000
Total	$600,000
Closing Inventory (Dec. 31, 1924)	200,000
Cost of Goods Sold	$400,000

1925	
Opening Inventory (Jan. 1, 1925)	$200,000
Purchases during 1925	600,000
Total	$800,000
Closing Inventory (Dec. 31, 1925)	300,000
Cost of Goods Sold	$500,000

EXAMPLE WITH INCORRECT INVENTORY FIGURES

1924	
Opening Inventory (Jan. 1, 1924)	$100,000
Purchases during 1924	500,000
Total	$600,000
Closing Inventory (Dec. 31, 1924)	250,000
Cost of Goods Sold	$350,000

1925	
Opening Inventory (Jan. 1, 1925)	$250,000
Purchases during 1925	600,000
Total	$850,000
Closing Inventory (Dec. 31, 1925)	300,000
Cost of Goods Sold	$550,000

From the above it appears that the total of the cost of goods sold both for 1924 and 1925 in the first example, $900,000, agrees with the total of 1924 and 1925 in the second example. The amounts for *each* year differ, however. The figures in the second example are based on the assumption (*a*), that that portion of the inventory which is excessively valued in the closing inventory for 1924, and hence carried into 1925 as a position of the opening inventory for that year, is disposed of in 1925, and (*b*), that a correct valuation is placed on the closing inventory for 1925. Should it be the case that any portion of the material, excessively valued in the closing inventory of 1924, is not disposed of in 1925 and appears at the same excessive value in the closing inventory of 1925, the profits of 1926 will also be affected by the incorrect pricing of the 1924 inventory. The effect of incorrectly pricing one inventory may be noticeably felt in the profits in one or more subsequent operating periods.

Inventories appear on balance sheets as current assets. Whether or not the entire inventory is deserving of such a classification has been discussed in another place. For the present discussion, however, the entire inventory is considered as a current asset. Hence any understating or overstating of the inventory results in a corresponding understatement or over-

statement respectively, of the current assets, working capital, total assets, and net worth of the business.

What has just been said about inventories, so far as its relation to the income statement is concerned, also applies in the case of the balance sheet. With the possible exception of such items as goodwill, franchise, and other intangibles, the inventory is the most difficult item on the balance sheet to value, or to verify by audit.

Size of Inventory.—Due to the enormous demand for products created through intensive and extensive national advertising, and also to the improved production methods which require both a constant flow of material and a sufficient reserve of materials at all times, the inventory of most concerns has been brought to the point where it is usually the largest item among the current assets, quite often the second in importance of all assets, and occasionally represents the greatest investment in any asset. For these reasons the control of inventories from three standpoints—financial, manufacturing, and sales—is becoming increasingly important. The following figures taken from the balance sheets of ten representative companies illustrate the increase in the investment in inventory over a period of ten years.

INVESTMENT IN INVENTORY

Name of company	1912	1922	Percentage of increase, per cent
Bethlehem Steel Company	$ 8,700,000	$ 50,938,000	485
American Woolen	18,762,000	43,367,000	136
Studebaker Corporation	15,730,000	21,514,000	37
B. F. Goodrich Company	16,226,000	22,811,000	41
Baldwin Locomotive	6,687,000	10,855,000	62
Republic Iron & Steel	6,970,000	13,831,000	100
U. S. Steel Corporation	152,412,000	220,707,000	44
Packard Motor Car Company	5,351,000	11,860,000	120
Goodyear Tire & Rubber Company	4,398,000	30,585,000	607
General Electric Company	37,150,000	88,100,000	137

Inventory from the Credit Standpoint.—By reason of its size and complex nature no other asset receives more careful scrutiny

on the part of the banker than the inventory. Of all other assets it is the one which is most generously discounted. The reason for this is obvious. The banker granting ordinary credit is unable to determine the true value of the inventory unless he takes upon himself a detailed and complete analysis thereof and combines therewith his judgment of present and future trade conditions. Such analysis implies the consideration of each of the large number of value-destroying contingencies which may or may not arise, either individually or in combination. Therefore, for the reason that he is in no position to give the necessary time required for such detailed analyses and because it is impossible to forecast with certainty what the future will bring, the banker is required to apply a generous discount to the inventory to reduce it to a figure representing safe liquidating value.

The percentage discounted, of course, depends upon many things: the type of business, the kind of merchandise (*i.e.*, a necessity or luxury, staple or specialty), the amount, quantity, and balanced condition of the inventory, condition of stock, unfilled orders, and many others. A manufacturer, for example, with an excessive amount of work-in-process and with little if any unfilled orders, must necessarily expect to have his inventory discounted to a far greater extent than another manufacturer with a small amount of work-in-process and a normal inventory of finished merchandise which can reasonably be expected to be disposed of in the not too distant future. In a period of adverse trade conditions a jobber whose inventory is one of necessities can expect far better terms than a jobber whose inventory consists principally of luxuries.

The inventory figure in the balance sheet submitted to the banker should be supported by a schedule showing the make-up of the inventory in reasonable detail. The amount of detail depends chiefly upon the kind and type of business, and should be such that a cross-section picture is presented to the banker for his ready analysis. The manufacturer, for example, should at least show under each product the amount of inventory of raw materials, work-in-process, and finished merchandise, by each style or type of product. The retailer, on the other hand, may set forth to advantage information applicable to his various classes of stock, dividing his new merchandise from his carry-overs, and showing such data in connection with his new merchandise that the amount on hand may readily be taken into

consideration with the total amount of purchases and with the percentage of the season that has already expired.

The banker will be aided in his problem of inventory valuation by calling for the "ageing" of the inventory, especially on the part of those concerns whose businesses are such as to require it. A manufacturer in the metal trades with a properly operated material control system, for example, should be able to very easily "age" raw materials, work-in-process (with special reference to finished non-current and obsolete parts and assemblies), and finished product. The ageing of raw materials might appear as follows:

Raw Materials	$375,000
Year Purchased	Amount on Hand
1919	$ 7,500
1920	20,500
1921	5,000
1922	51,000
1923	30,000
1924	261,000
Total	$375,000

Inquiries made as to the reason for the larger amounts in the earlier years will generally disclose the information that these amounts are made up principally of one or two items of material which were purchased in excess of requirements, for certain products the manufacture of which did not materialize, or were made obsolete by changes in design or specification.

In connection with the review of an inventory in so far as it is applicable for credit purposes, William S. Kemp of the Holtzer-Cabot Electric Company, says:

> This asset of merchandise inventory is in most lines of manufacturing business the largest single item among the current assets and is the one about which so little definite knowledge is to be had that bankers and credit men usually figure it at 50 cents or less on the dollar. Need this be so? Of course, the liquidating value of a merchandise inventory depends largely on the lind of business and the form in which the merchandise exists, and on the market at the time of liquidation Its value further depends on whether it is raw materials, work-in-process, finished parts, or completely finished goods, and whether or not the finished product is standard or special.

In the first place, the amount of merchandise inventory should be supported by departmental inventory records. This should be done for both finanacial purposes and for management purposes. Whether or not the individual stock records are carried in quantities or in money value will depend upon conditions and the kind of business, but all transfers to and from each store or department should be made in money value. On what basis these inventory values should be established and carried in the financial accounts is, I believe, one of the most important questions confronting all interested parties, namely, cost accountants, public accountants who certify balance sheets, credit men, bankers, officers of corporations, stockholders and finally the state and federal tax departments.

Now as to the basis on which we should value our merchandise inventory, personally I feel that we are fast getting away from the old idea of actual individual costs. We all know that the cost of a particular article made at different times varies greatly. At one time the material may work hard, the labor thereon may be inefficient, the machine equipment may be in poor condition, and so on, resulting in an actual isolated cost far in excess of even its market value. Under such conditions, what justification is there for charging the finished article into merchandise inventory at its actual cost? Again there are periods of depression, when, if all overhead expenses are charged into cost of *current* production, the actual cost will be far in excess of market value. Please note carefully that I stipulate cost of *current* production. These conditions have recently led to the serious consideration of "normal costs."

In attempting to establish whether or not the inventory as presented on the balance sheet is of excessive valuation or not, the banker many times relies upon the use of various ratios. One of the most popular ratios in connection with inventories is that of the sales to merchandise which in the final analysis is really the ratio of the cost of sales to merchandise, for the reason that the total sales naturally contains the element of profit and is not strictly comparable with merchandise taken at cost. This ratio properly used will many times indicate an excessive amount of total inventory without in any way indicating its unbalanced condition. While it may appear as a result of using the above ratio that there is a normal amount of *total* inventory being carried, the actual facts might be that there is an unusually small amount of finished product and work-in-process, and at the same time an abnormal excess of raw materials. To obtain the full benefits of the above ratio it is necessary to have available a detailed analysis making up the various elements of the inventory.

In connection with the use of ratios from the standpoint of analyzing financial statements for credit purposes, the following remarks by Frederick S. Sibley, Vice President Rhode Island Hospital Trust Company, are of interest:

> Many instances have occurred in recent years during the periods of great fluctuations in values, which have exploded the old theory that the two to one ratio of quick assets to current debt is a sure guarantee against failure. The credit man has learned to get behind figures which run solely in dollars to the quantity figures which lie behind the dollars. He has seen the dollar values of a given inventory rapidly blown up and as rapidly deflated, and he has learned that in addition to the ratio between the current assets and debts of a customer, there are many other things which it is necessary to know in order to be informed properly regarding the business.
>
> What is the condition of the merchandise or inventory? Is it overloaded with raw material not suited for the present needs of the business, or worse still is there a large proportion of finished merchandise which is unmarketable? Or if it be a jobber or retailer has the merchandise deteriorated in value through neglect, or has the customer been imprudent in his buying, either as to amount, kind, or quality?

Because of the fact that there are so many conditions which may effect to bring about loss of value in the inventory it is only with the greatest amount of analysis that a valuation can be placed thereon which makes for safety in the granting of credit. The use of ratios by themselves is not enough. In addition it is necessary that in support of the total inventory figure there be presented to the one from whom credit is desired a statement showing the inventory in such detail as will allow its true condition to be readily understood.

Perpetual Inventory versus Physical Inventory.—Many arguments are presented from time to time concerning the respective merits of the so-called perpetual inventory (more correctly, a material control system) and the physical inventory. Unfortunately, the basis for these arguments is incorrectly chosen. It is not a question of the advantage of the so-called perpetual inventory over the physical inventory—or vice versa—for such an argument presupposes that the perpetual inventory is limited to one principal use *i.e.*, a means for establishing the valuation of inventories for administrative and financial purposes. This assumption is hardly a fair one because in most instances the perpetual inventory (the material control system) will justify

itself even though its use for financial purposes (the only principal function it has in common with the physical inventory) is not availed of. The chief value of the perpetual inventory, with its necessary forms and procedures, lies in its ability to furnish at all times detailed and current information pertaining to each material.

The original perpetual inventory has evolved to the present system of material control. From a beginning where simple records were kept showing only the quantity of different materials on hand, the present elaborate system of material control has been developed. In spite of this decided advancement, the term "perpetual inventory"—a term too limited for describing a material control system—still persists and probably will continue to exist. The material ledger inventory feature is but one of the great number of advantages which accrue from the present-day material control system, and it is this feature alone which can only be entered into argument when the merits of the physical inventory are compared with the perpetual inventory. The perpetual inventory system was designed, not as means for eliminating the burdensome work of a physical inventory, but primarily developed for material control purposes. A rather crude control at the start to be sure—but a beginning. And it was only after the reliability of the material control system developed that attempts were made to substitute the material ledger inventory in place of the physical inventory which is so costly to take and so disturbing to production programs.

The following advantages are advanced in favor of the material ledger inventory over physical inventory:

1. It is not necessary to shut down the plant one or more times a year. Therefore, loss due to the cessation of production and the usual large expense of taking a physical inventory is eliminated.
2. Actual counting of stock can be done by degrees rather than at one time. Hence the perpetual inventory can be made more accurate than the physical inventory.
3. Storekeepers are more careful in the treatment of material if they know that their stock is subject to check without notice.
4. Differences between material ledger quantities and actual counts can be traced down more easily and within such time as to correct irregular practices.
5. Results of an inventory can be obtained more quickly than in the instance of a physical inventory.

6. Adjustments to the "Inventory Controlling" account can be made monthly instead of but once a year. Thus the profits shown on the monthly report of operations will be more correct and in accordance with actual facts.

In comparison with the above the following are usually considered as the advantages of the *physical* inventory:

1. It serves as a *complete* verification of material even if a material control inventory is kept.
2. It will give more accurate results than a book inventory in the case of bulk materials.
3. It gives more accurate results in the case of work-in-process than book records will give.
4. It affords a time for returning to the various storerooms all excess materials in the various operating departments.
5. It affords a time when the plant may be cleaned up and put in effective operating condition for another year.

Advantages of Material Ledger Inventory.—A firm which is required to shut down its plant once or twice a year to take a physical inventory not only incurrs a large expense by reason of non-productive payrolls, but it loses at least several days of the operating year with resultant loss of production. This is especially expensive if there happens to be a large amount of unfilled orders on hand. The cost of loss of production can be closely figured by multiplying the number of days required to take a physical inventory by the average earnings of the concern per day.

If a material control system is properly operated, the various quantities on the material ledger will be verified from time to time with an actual count of the material in the storeroom. In fact if constant checking is not done and the reason for discrepancies ascertained the material ledger quantities cannot be relied upon. If the checking is well done the count should be more accurate than in the case of a physical inventory where the spirit seems to be to get the work done as quickly as possible and where accuracy is many times sacrificed.

One big advantage of checking the quantities of materials during the operating period is the opportunity given of inspecting and protecting material in such time as to prevent loss through deterioration—a loss of no small amount to any concern. It is well known that a person whose work is subject to check

at any time accomplishes his work in a better manner than would otherwise be the case where the exact date of verification is known. Storekeepers, therefore, are bound to take more care of their stock when they are subject to the continuous check required under a properly operating control system. As a result losses usually arising from damaged, spoiled, or broken material in stores will be greatly reduced.

Where an inventory of certain items is being taken day by day, the differences between the ledger figures and the actual count can be traced down more easily than if the differences are discovered but once or twice a year. In the former instance it is possible in most cases to locate the causes for the difference and to institute procedures which will prevent such discrepancies in the future. Where material is counted but once a year the difference between the book figure and physical inventory figure is very seldom inquired into unless the difference is an unusually large one. Even then so much time has elapsed between the various movements of materials that it is practically impossible to locate other than clerical errors.

As it is only necessary to refer to the various material ledgers and transcribe the description, quantity on hand, and unit cost applicable to each kind of material or merchandise, to the inventory sheets, an inventory both in detail and in total amount can be more quickly obtained in this instance than in the case of the physical inventory.

Advantages of a Physical Inventory.—No matter how carefully material ledgers may be operated there are so many variable conditions in connection with the movement of materials that in spite of frequent spot-checking of material in the storerooms many of the ledger quantities will differ from the actual quantities of materials. In fact, if an inventory is taken from the material ledger as of Dec. 31 it is a safe bet that no more than 3 or 4 per cent of the material has been physically verified within the period of a week. The remaining 97 or 96 per cent will consist of materials most of which have not been checked for months. The chance for discrepancies between the ledger quantities and actual quantities in connection with this 96 per cent of the inventory is too serious to disregard. Therefore as the inventory to be used for financial purposes is supposed to represent material actually on hand, it is not the safest thing to prepare such an inventory from the material ledgers. Only a

physical inventory which affords the counting, weighing, and measuring of *all materials at the same time* will furnish results paralleling actual conditions.

Bulk materials can very seldom be issued out from the storeroom in the exact quantities called for by the requisitions. As a result there is generally an over- or underissue of this kind of material. The only positive means of knowing the exact quantities on hand is to make a physical counting or weighing of it. The ledger accounts for such materials usually show quite a different figure than is actually on hand.

Whether material ledgers are being operated or not for the purpose, among other things, of eliminating the physical inventory—a physical counting of all *work-in-process* must be made. It is safe to say that it is the exceptional concern which can prepare its inventory work-in-process from its production and cost records.

During the operating period a great deal of material generally accumulates in various departments. Such accumulations may be the result of several causes. Material may have been overissued or it may have been correctly issued but not used for the job or order it was intended for. Such material usually remains in the departments until a physical inventory is taken. It is one of the rules of preparing the plant for the physical inventory that all excessive material be returned to the storerooms. The above condition exists not only in poorly managed plants but also in many of the well-operated concerns. Cleaning up departments by the return of excessive material to stores not only puts those departments in a better condition for future operations but it allows the material records to be corrected to agree with the status of the material itself.

In spite of constant maintenance and repairs during the year, certain work in connection with the efficient operation of the plant can only be accomplished when the plant is shut down for several days. In most cases inventory time is an excellent time for giving the plant a thorough overhauling and putting it in good shape for the subsequent year. Although it hardly seems proper to claim this as a direct advantage of the physical inventory it is a feature which is at least an indirect advantage resulting therefrom.

Present Tendency for Physical Inventories.—In spite of the fact that many excellent material control methods are now being

operating by progressive concerns and in spite of the fact that theoretically it would appear that the need for physical inventories would thus be eliminated, very few concerns have given up the taking of physical inventories once or perhaps twice a year. This is brought about no doubt by reason of the fact that so many conditions surround the movement of materials that even the most carefully maintained stock records vary by too great an amount from the actual inventory. It is not incorrect to say that the one factor above all others which makes a physical inventory necessary is the human element—something that has defied and still defies all attempts to reduce it to any kind of a constant factor. Although a good material control system with its material ledgers is a real necessity at all times during an operating period, and while it will repay its user time after time by savings effected in stock reductions, material losses, and uninterrupted production, it is quite evident that the point has not yet been reached where those material ledger figures may generally be used for financial purposes. It appears that the greater majority of concerns which have material control systems will continue to take physical inventories; those without such systems will always be required to take them.

The taking of a physical inventory will never become an obsolete undertaking. Whether or not it will be required annually or semiannually for the financial statement purposes depends upon several matters, but it will always be required in order to start a material control system, and then from time to time to check it in its entirety.

Responsibility for Inventory.—The question is often asked as to what division of the organization should be responsible for undertaking the work of the physical inventory. In the case of the manufacturing concern, should the financial division or the operating division be responsible for this task? In the instance of the retailer should the work fall to the lot of the merchandising division or to the financial division?

With respect to manufacturing concerns, most inventories are unfortunately supervised entirely by the financial division with the result that the operating division is generally unable to obtain the large amount of information which it can use to good advantage. Neither one division nor the other should be in absolute control of the inventory, for under such conditions it is not possible to secure the greatest benefits. There should

be an equal spread of responsibility between these divisions, and if the inventory organization has been properly planned it will come to pass that the requirements of both divisions will be appreciated ahead of time, and the results desired by each, satisfactorily obtained.

In connection with this subject Edward T. Elbourne says:[1]

"This requirement may be held to be entirely financial and seem outside the conception of a record for administrative purposes and even beyond the scope of cost accounts. The process of stocktaking so intimately touches the ordinary field of administration and, to be efficiently carried out, requires so much technical assistance that it is likely to be in the best interests of the firm for stocktaking to be treated as a function of technical management and its lessons appreciated and utilized for administrative purposes."

So far as retail organizations are concerned, it will be found that the responsibility of the inventory is placed entirely in the hands of the financial division. In the larger retail establishments the controller is usually charged with, and responsible for, the inventory.

[1]Factory Administration and Cost Accounts.

CHAPTER II

PLANNING THE PHYSICAL INVENTORY

At the present time the inventories of most concerns are based on a physical counting of the materials and merchandise on hand, and not on a book record. Hence, at least once during the operating year of practically every industrial and merchandising organization there comes a time when a certain period must be surrendered (*a*), to count stock (*b*), to place correct unit values thereon, and (*c*), to arrive at an amount which is supposed to represent the toal valuation of the entire inventory.

To the uninitiated this period means merely the counting of all materials on hand; a period for repairing and putting the plant in order for another year's work; a period to be used by certain departments to "catch up." On the other hand this period to the initiated means other things: the creation of a large temporary organization to take the inventory; the proper instructing of this organization; the planning and preparing of a large number of procedures and rules; the careful supervision of all features connected with the works; the acceptance of added responsibility carrying much criticism and very little, if any, reward.

Because the physical inventory is a "necessary evil" received with no enthusiasm by the organization to take it, and expensive to a concern both by reason of loss of production and large unproductive payrolls—it is usually given less consideration than it deserves, although it usually is the largest current asset on the balance sheet, and if properly taken and arranged may disclose a vast amount of valuable information for administrative purposes. Many executives will readily admit that year after year they are dissatisfied with the inventory result. These same executives, however, fail to observe two things (*a*), the many difficulties which arise in connection with this problem, and (*b*), that they themselves are responsible for placing such important work in the hands of employees who will not exert sufficient effort to plan and prepare the work intelligently and thoroughly. The interval of a year, or perhaps half a year, is sufficient time to

allow the mistakes of the last inventory to be forgotten with the result that unsatisfactory conditions continue year after year.

The principal reasons for an unsuccessful inventory may be briefly summarized as follows:

1. The inventory organization is a temporary one. As a result there is little or no feeling of responsibility.
2. There is an antipathy to inventory work on the part of most employees, especially office employees.
3. Many employees seek exemption from the inventory on the plea that work in their own departments is behind schedule; that the inventory period affords them an opportunity to "catch up."
4. Department heads generally fail to realize the necessity for cooperation and hence attempt to have as many as possible of their own subordinates excused from inventory work.
5. Employees as a rule dislike being under the supervision of a temporary boss.
6. There is a general feeling that inventory time is a rest period.
7. It is difficult to find an inventory supervisor broad enough to understand thoroughly the relation of the inventory both to the administrative, accounting, and production departments.
8. Many concerns lack, and have lacked for years, a concept of what should constitute an inventory organization.
9. Employees are not properly instructed in the duties which they are to perform.
10. Preparation for the inventory is left until the last minute, with the result that confusion exists from the start.
11. Employees are at a loss to know exactly what is to be done and in what manner. Thus, more time is required for taking the inventory than should be necessary, and at the same time a great deal of valuable information is never obtained.
12. No arrangements are made ahead of time to put the plant in such order as will facilitate a quick, accurate, dependable, and time-saving count.
13. The manufacturing departments are allowed to resume operations before the inventory is completed.
14. No inventory manual, containing complete and detailed instructions and procedures for the guidance of all, is available.

It is not strange, therefore, that employees take no interest in the physical inventory when executives themselves, show so little concern in establishing definite and complete inventory programs, failing at the same time to instruct employees in the far-reaching value that attaches to a successful inventory.

An employee, who has received no previous instructions, does not feel enthusiastic when informed a day or two prior to the inventory that he has been assigned to inventory duties. He is not eager on inventory day to perform these duties, not knowing what he is to do, why it is to be done, and how it shall be done. Is it any wonder that the results of most inventories are not successful? Is it strange that the shut-down periods for inventory are excessive?

The Inventory Manual.—The first step, therefore, to bring about a more successful physical inventory is the preparation of an *inventory manual*—a book of instructions, procedures, forms, tabulations, and all other necessary inventory information for the guidance of those who are to participate in the inventory. A manual once prepared should be added to from year to year as the result of experience gained in past inventories. Every special ruling approved of, all necessary changes, new procedures surrounding new conditions—all of these should be incorporated in the manual and preserved as the best and accepted inventory practice.

The Five Operations.—In a discussion of the subject of physical inventories there are five principal operations to be considered. These are:

1. Planning the inventory.
2. Preparing for the inventory.
3. Taking inventory.
4. Pricing inventory.
5. Tabulating or scheduling.

This chapter deals with the first operation—that of planning the inventory. The four other operations are taken up in their respective order in subsequent chapters.

Planning the Inventory.—Planning the inventory requires the same careful study and consideration of every essential feature as the planning of any other undertaking of magnitude. It requires, first, the knowledge of what results are to be obtained and with these in mind, such procedures and arrangements should be made as will permit them to be obtained in the most effective manner. The purpose of planning for the inventory is to accomplish the results desired in the shortest possible time, by as small an inventory organization as possible, and with a minimum of disturbance and confusion. The final results to be obtained from the inventory are the tabulated summaries.

In this chapter the use of the inventory summaries for financial, production, purchasing, and sales purposes are given and, in addition, the necessary plans required to be made for taking and completing an inventory in the most effective manner.

Use of the Inventory.—An inventory should be so planned that the results may be used for the following purposes:

Financial.

1. General balance sheet.
2. Profit and loss and income statement.
3. Income tax returns—Federal and state.
4. Personal taxes.
5. Adjustment of book inventory and cost of goods sold.
6. Depreciation and obsolescence of stock.
7. Insurance.
8. Inventory turnover.

Manufacturing.

1. To correct and adjust stores ledgers with the physical inventory, and to reconcile the controlling accounts.
2. To adjust production records.
3. To revise production schedules, especially with respect to material which records do not show as being in the process of manufacture.
4. To correct the quantities shown on bin tags with actual quantities inventoried.
5. To discover obsolete materials in production which are supposed to have been discontinued.
6. To discover "lost" lots or orders in the shop.
7. To determine the unbalanced condition of raw material, parts, and assemblies.
8. To show the reduction of obsolete and non-current models, products, and materials.
9. To show the amount of obsolete stock on hand, caused by engineering or specification changes on current models or products.
10. To determine whether the indirect materials and consumable tools are in excess of requirements.
11. To determine an overstock of spare parts which might be released for the manufacture of product.
12. To determine shortages in spare parts stores causing poor service to customers.

Purchasing.

1. To prevent overpurchasing with the resulting excessive inventories.
2. To enable the purchasing department to learn of shortages in stock which should be ordered at once in order to prevent a tie-up of production.

3. To render information concerning obsolete raw material on hand which may be disposed of to other concerns.
4. To notify the purchasing department of all rejected material which, because of defects, should be returned to vendors.
5. To report materials owned by the company, on consignment at other plants for manufacture.
6. To notify the purchasing department of obsolete indirect materials and consumable tools which may be disposed of to other concerns.

Sales.

1. To show the quantity of finished products at various locations.
2. To show the quantity of products at exhibitions, fairs and permanent shows.
3. To compare unfilled orders with stock on hand.
4. To show details of the unfilled and unshipped orders.

These uses of inventory data are not exhaustive but are indicative of what administrative information may be obtained if the inventory is properly summarized. The reasons, then, for taking a physical inventory may be summed up in the following two paragraphs:

a. To determine, by actual count, inspection, and classification, the material and quantity thereof on hand as of a certain date, with sufficient description properly and completely to report its condition.
b. To provide correct and complete tabulations of materials on hand and their values in such arrangements as will assist the administrative, manufacturing, sales and purchasing departments in the administration of their policies and in the adjustment of their records.

Organization and Personnel.—Once it has been determined exactly what reports and summaries of the inventory are required and how they are to be arranged, it is necessary that there be planned an organization to bring about the results desired. To head such an organization, the management should appoint an inventory supervisor who should be given full authority, and who should be capable of accepting full responsibility for planning and preparing all instructions and procedures relative to the inventory. This appointment should be made at least two months before the day set for the inventory in order that sufficient time may be allowed for the preparation of each and every detail. To assist the supervisor in matters of policy, the management should also appoint an advisory committee com-

posed of the heads of the important departments of the plant. The following is a representative committee:

1. Superintendent of materials.
2. Superintendent of inspection.
3. Auditor.
4. Factory superintendent.
5. Cost accountant.
6. Representative from planning or production department.
7. Representative from purchasing department.

This committee should meet with the inventory supervisor as soon as possible after it has been appointed. As such meetings, the supervisor should be chairman, and it should be his duty to bring before the committee all matters that require thorough consideration before being incorporated in any procedures or instructions. It should be the duty of the supervisor, acting with this committee, to prepare plans for every feature of the inventory, the organization and personnel, the materials, the forms, the plant, the pricing, the summaries, and all matters relative to the inventory.

With the knowledge of that results are to be obtained, the first duty should be to decide upon what type and size of organization is necessary for taking, pricing, and tabulating the inventory. If no definite organization has existed in the past the following divisions are suggested, and the functions of each described.

Organization.—The inventory organization should consist of seven divisions:

1. Physical count division.
2. Inspection and classification division.
3. Tag-writing division.
4. Clearing house division.
5. Coding division.
6. Pricing division.
7. Tabulating division.

Each division should have a responsible head appointed by the inventory supervisor and approved by the advisory committee.

Physical Count Division.—The function of this division is to count the material during the inventory and to report the count to the tag writers. The division chief in charge should be responsible for the accuracy of the *physical count.* Assigned to him, and directly under his supervision, should be all shop foremen

who should direct the counting of all materials and supplies in their respective departments. Each foreman should have assigned to him all, or a portion, of his operating force to act as counters during the inventory. It is the duty of these counters to make a thorough and accurate count, measurement, or weight of all materials and supplies in the department or section of the plant to which they have been assigned. These counters should not write inventory tags. Instead, they should report to the tag writers such information as will be written on the inventory tag. Where the entire operating force of a department is not to be used, the foreman should select his most capable men for participation in the inventory and should take pains to place the best men on the most difficult work. These counters should be responsible at all times to their foreman, and should act in accordance with his instructions.

The number of counters required in each department is dependent upon many conditions: the kind of material, the amount of material, its arrangement, and the facilities for counting, weighing, or measuring. Past experience is practically the only means that can be used to determine how many counters are needed in each department, storeroom, or other location. If, when the inventory commences, it is found that more counters are needed in certain departments, those departments should be furnished with additional counters at once; where it is found that too many counters have been assigned to other departments, they should be transferred either to departments needing them, or released from inventory work.

Inspection and Classification Division.—The functions of this division may be divided into those to be performed prior to and those to be performed during the inventory. The functions prior to the inventory are to inspect and identify all obsolete, salvage, and spoiled material; to identify all material on consignment for manufacture or repair; to identify all defective material rejected upon inspection and awaiting return to vendors; to inspect and have transferred to stores all finished parts and assemblies. The duties during the inventory are: to inspect and assist tag writers with respect to raw material, parts-in-process or other material to be described on inventory tags.

As chief of this division, no better selection may be made than the appointment of the chief inspector. Under his direction, the regular inspection force should be assigned. They should be

stationed in those sections of the plant where their services may be utilized to best advantage. It has been found from experience that inventories are greatly retarded by an insufficient number of inspectors. For this reason, all regular inspectors should be used on the inventory. If possible, this division should be augmented by such foremen or subforemen as are capable of performing duties required of the inspectors during the inventory; men who are not required as chief counters in their departments. Inspectors should cooperate to the fullest extent, answering technical questions concerning operations, work-in-process, obsolete material, and salvage material, and advising in many other matters which naturally arise during the inventory.

Tag-writing Division.—The function of this division is that of writing inventory tags—placing thereon such information as is reported to them either by the counters or the inspectors. The division chief in charge is responsible for the correct transcription to the inventory tags of all information concerning the material counted, weighed, or measured.

The number of individual tag writers to be assigned to each department is dependent upon the contents and product of that department and can only be determined from experience. In some plants it is possible to assign one tag writer to work in conjunction with five or six counters. Dependent on the nature and quantity of material to be counted, either more or fewer counters may work to advantage with one tag writer. One of the common faults of most inventory organizations is that those who write tags also count stock. This procedure is slow and less accurate than the method of having the two operations performed by different employees.

Clearing House Division.—The function of this division is to issue, receive, and account for all inventory tags; to return all inaccurate or incomplete inventory tags to the tag correctors for correction; to determine if all the necessary information required is written on the inventory tags; to certify that the inventory tags are correct and contain sufficient information for correct pricing. This division may be called the keystone division of the organization, for upon it rests the heaviest burden. It should be headed by a division chief and the following assistant chiefs:

1. Assistant chief—custodian.
2. Assistant chief—direct material checking.

3. Assistant chief—indirect material checking.
4. Assistant chief—tag correcting.
5. Assistant chief—final verification of tags.

The "custodian" is responsible for issuing and receiving all inventory tags. He should maintain records that enable him to determine at all times the location of every tag. One or more employees should be selected to assist him in his work, the number depending upon the quantity of inventory tags to be issued. The custodian is also responsible for furnishing the inventory personnel with all necessary supplies and forms.

The "assistant chief—direct material checking" is responsible for the thorough examination of every inventory tag upon which direct material is reported. He should have assigned to him a sufficient number of checkers for performing the actual work of tag examination. The number of checkers so assigned is dependent upon the number of tags and the amount of information to be verified. The direct material checkers should be assigned to check certain portions of the inventory tag only—not the entire tag.

The "assistant chief—indirect material checking" is responsible for the accurate and careful checking of all tags upon which indirect material has been reported.

The "assistant chief—tag correcting" is responsible for the correction and completion of such tags as are found to be inaccurate or incomplete. His assistants, known as "tag correctors," should be assigned to the different departments of the plant and they alone should make corrections on the inventory tag. In the scheme of the organization outlined, the purpose of this division is to prevent the loss of tag writer's time. This arrangement enables the tag writer to proceed with his work, without interruptions due to any errors or omissions which he may have made on inventory tags already delivered to the clearing house. The duty of a tag corrector is to locate material which has been incorrectly or incompletely reported, and change the inventory tag in accordance with actual conditions and facts.

The "assistant chief—final verification" is responsible for the last examination of all tags prior to their release to the coding and pricing divisions. He should inspect each inventory tag after it has been checked and approved, to satisfy himself that all errors or omissions have been discovered and corrected.

Coding Division.—The duties of this division may be summarized as follows:

1. To examine each inventory tag, and to determine if any data may be coded.
2. To code information written on inventory tags for the purpose of expediting subsequent sorting, pricing, and tabulating.

The division chief of this section is responsible for performing the above quickly and correctly. Enough employees should be assigned to assist him in this work to insure tags being coded and passed on without delay to the pricing and tabulating divisions. No definite number of coders required may be specified as this depends upon the number of code schedules and the number of inventory tags used.

Pricing Division.—The function of this division is to price, extend, and verify all inventory tags which have been delivered for pricing. It will be found advantageous in pricing to establish various sections; a section for the direct, and a section for the indirect material. In pricing direct material, the work may be further facilitated by assigning certain employees for labor pricing, others for material pricing, and still others for overhead pricing. In addition, other employees should be assigned to perform the work of totaling the unit cost. To speed up the work of extending and checking extensions the chief of this division should obtain a sufficient number of calculating machines.

Tabulating Division.—The function of this division is to prepare and arrange from the completed and priced inventory tags such schedules as may be required by the management. The division chief should be responsible for the final tabulations of the inventory. The number of employees to be assigned to this division is dependent upon the number of reports required and the number of inventory tags used.

Organization Chart.—Some few weeks prior the inventory, the inventory supervisor, acting with the advisory committee, should prepare a chart of the inventory organization in such detail that each employee assigned to the inventory may learn exactly under whose supervision he is to be placed. This chart allows the supervisor to "balance" his organization and later to prepare the "Employee Assignment List," discussed in a later chapter.

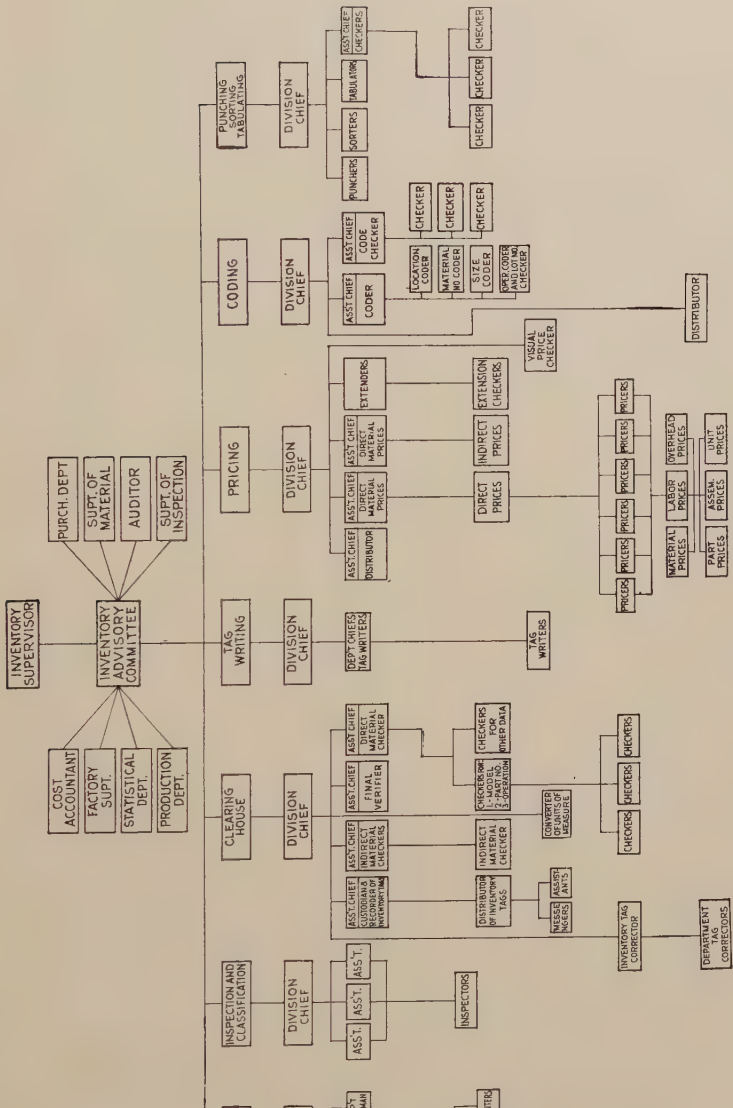


Fig. 1.—Inventory organization chart.

In addition to the organization chart, it will be found advantageous to prepare another chart showing the location of each member of the inventory organization on the day that the inventory starts. This may be best shown by use of an enlarged blue print of the entire plant, mounted preferably on a drawing board. Tacks of different colors representing the several divisions, should be placed in their proper positions on the blue print. By assigning a number of each employee of each division and using colored map tacks upon which are surmounted corresponding numbers, the location of each member of the organization may be readily determined. For example, assume that red map tacks are to be used to identify the inspection division. If thirty inspectors are to be used on the inventory, red tacks numbered from one to thirty, should be placed on the blue print in those departments to which the inspectors have been assigned.

This chart, if properly made, is an excellent means for the inventory supervisor and the advisory committee to determine whether the organization is properly balanced at the start.

From time to time during the inventory the supervisor is usually required to transfer employees from one department to another. These transfers as described in a subsequent chapter are authorized on the form "Notification for Transfer of Personnel." By means of a copy of this form which is retained by the supervisor, the chart can be changed in accordance with all transfers and should thus present a continuous graphic picture of the location of all employees.

Identification Stamps.—As stated previously, each employee assigned to the inventory should be given an identifying number. If this is done, then small rubber stamps with these identification numbers thereon should be furnished all employees (with the exception of the counters) and affixed by them to each inventory form which passes through their hands. In addition to identifying the employee, these stamps make it unnecessary for anyone to use initials or names. Considering the number of persons who handle an inventory tag, a great deal of valuable time may be saved by the use of such stamps. The supervisor and the advisory committee should arrange for the design, the number of stamps required for each division, and the identifying serial numbers for each division.

Identification Buttons or Badges.—If the organization is a large one it is natural that many employees should fail to recog-

nize division chiefs and others holding supervisory positions during the inventory. To prevent any confusion or misunderstandings, it is good practice to furnish identification buttons or badges to those employees charged with directing certain divisions of the work. These buttons or badges should have the name of the official title printed thereon and their color should correspond with the various division colors.

MATERIALS

When the inventory supervisor and the advisory committee have considered each detail of the organization and have selected a personnel which can complete the inventory within the specified time, they should take up for discussion all matters relative to the material to be inventoried. They should set forth a definite program with respect to the following:

1. Materials to be included in the inventory.
2. Materials *not* to be included in the inventory.
3. Materials to be inventoried by estimate and approximation.
4. Materials in transit—inward.
5. Materials in transit—outward.
6. Rejected materials.
7. Obsolete materials.
8. Salvage materials.
9. Non-current materials.
10. Scrap.
11. Consumable tools.
12. Operating, maintenance, and repair supplies.
13. Packing and shipping supplies.
14. Consigned materials owned.
15. Consigned materials owned by others.
16. Materials to be considered direct.
17. Materials to be considered indirect.
18. Materials to be counted and reported but not included in inventory total.
19. Classification and status of materials.
20. Locations where material is to be inventoried.
21. Shipments and internal movements of materials during inventory.
22. Receipts of material during inventory.
23. Methods of counting, weighing, and measuring materials.

Each of the above subjects should be given careful consideration in order that detailed and complete instructions for the

inventory personnel may be drawn up by the supervisor. In connection with the locations at which various materials are to be inventoried, great care should be exercised to list every place, whether foreign or domestic, where material is on hand. If this is not done many articles of considerable value will be overlooked and consequently not taken into the inventory. A list of material locations should be prepared by the supervisor, but only after he has conferred with all department heads and has secured the necessary information from them.

Any and all matters of an unusual nature which the supervisor and the committee cannot pass upon, should be referred to the management for decision, and no instructions regarding materials should be given out until every matter has been definitely decided upon and approved by the management and the committee.

PLANT

Following the planning of the organization to take the inventory and decisions regarding materials to be inventoried, the next matter for the supervisor and the committee to consider is the preparation of the plant. Unless the plant is properly arranged and prepared for the inventory, an unusually long shut-down period will result, and the expense of taking and summarizing the inventory will be increased.

First of all the entire plant should be cleaned up, and all materials should be arranged so that counting will be facilitated. If possible, material should be grouped so that all of one kind of material will be inventoried in one place. If parts, assemblies, and other materials are scattered throughout the plant, it will be necessary to write an excessive number of inventory tags. As each additional tag requires additional work to check, correct, code, price, and tabulate, the inventory expense increases in proportion to the number of tags used.

A big saving can many times be made in taking a physical inventory if certain materials in the store rooms can be inventoried in bulk. By the use of standard sized barrels, boxes, and containers which hold a definite number of parts or units of material, much of the actual counting and weighing can be avoided, and the results will be so nearly accurate that for all practical purposes they can be accepted as correct. Whatever difference there may be between the quantity secured by this method and the

quantity secured by actually counting or weighing each unit, this difference is usually so small as not to warrant incurring the extra cost needed to obtain results by the latter process.

Plans for preparing the plant for inventory should include procedures covering the following points:

1. Cleaning the departments.
2. Arranging the departments.
3. Disposing of scrap.
4. Segregation of rejected, obsolete, salvage and consigned materials.
5. Clearing the machines.
6. Arranging raw, rough, and finished materials.
7. Arranging work-in-process.
8. Clearing inspection cribs.
9. Returning surplus materials to stores.
10. Identifying materials.
11. Testing and arranging mechanical equipment to be used for counting, weighing, or measuring.

FORMS

Before any inventory forms are prepared, it should be the duty of the supervisor and the committee to determine definitely what forms and how many of each are required. The necessary forms should then be designed and the use of each explained. It is necessary that forms be planned not only for the control of materials but also for the control of personnel during the inventory, for consideration must be given to each feature of the inventory and a form designed to control that feature from the start of the inventory until its completion. Quite often the only forms used are the inventory tags and summary sheets. There are too many important features to an inventory to expect that these forms alone can furnish the accurate results required.

It is necessary not only to decide just what forms are necessary but also to determine their design, their use, and the quantity of each required. If the design is planned hurriedly, valuable information may be lacking at the finish of the inventory; if a sufficient number of forms is not available during the inventory the result of course is disastrous. Each form should be so designed that the time of the employees using them will be conserved. Complicated and poorly arranged forms are so wasteful of time that it should be the duty of the committee critically to review each form before approving it.

The following features should be given careful consideration:

1. Forms required—names and numbers.
2. Use.
3. Color.
4. Size.
5. Quantity.
6. Design.
7. Purpose.
8. Simplicity.
9. Information required.
10. Used by.
11. Instructions for use.

Estimating the Number of Inventory Tags Required.—Although it is not necessary that the number of tags required for the inventory be estimated within close limits it is quite important to see that enough are on hand to satisfy all requirements. To run short of these tags during inventory taking is a serious situation. The number required can generally be estimated within reasonable limits by using first of all information concerning the number of tags used in past years and then by employing the following figures:

a. Number of accounts carried in the raw material ledgers (raw material stores).

b. Number of accounts carried in the supply ledgers (operating and maintenance supplies stores).

c. Number of accounts carried in worked material ledgers (finished parts and assemblies stores).

d. Number of accounts carried in the finished product ledgers (finished product stores).

e. Number of jobs in process as per production department records.

Date of the Inventory.—The date for beginning the inventory is set by the management and not by the supervisor nor the advisory committee. The period of shut-down, also, is determined by the management. In most cases it is customary to set aside a certain period for stock taking with no knowledge of whether or not the period is longer or shorter than is necessary for taking the inventory under a well-planned program. In many instances so short a period is allowed that a complete and accurate

count is impossible; in other instances the period is so long that the inventory is dragged out, and expenses reach an unnecessarily high figure.

It should be one of the duties of a supervisor, after conference with his advisory committee to advise the management concerning the shut-down period. In determining the length of time necessary to take inventory the following should be kept in mind: that better results will be accomplished if a reasonable time limit is set, and the organization worked under reasonable pressure. Under no conditions should accuracy or completeness be sacrificed, and under no conditions should the inventory be allowed to drag out one day, or one hour, longer than is absolutely required. As the purpose of planning is to obtain the results desired at the lowest cost, it is imperative that the amount of time for taking the inventory be reduced to a minimum.

CHAPTER III

PREPARATION FOR THE PHYSICAL INVENTORY

Instructions.—The next step to be taken after all necessary plans have been carefully laid, is that of *preparing* for the inventory. This duty falls upon the shoulders of the inventory supervisor. It is the most trying task of all, for the success of the inventory depends largely on the early and thorough preparation of the many necessary features. Should by chance some essential or perhaps some smaller detail fail to receive its proper attention beforehand, the result may disorganize the work during the inventory. Lack of preparation may be said to cause more unsuccessful inventories than any other element, and in addition it extends the stock-taking period thus resulting in an expense far in excess of that incurred under more ideal conditions. Such expense is chiefly on account of the loss in production and the large unproductive payroll expense during the inventory.

In preparing for the inventory the most important thing is the necessity of promulgating explicit instructions for the guidance of the entire inventory organization. Without such instructions the cause is lost. These instructions should not be the mere setting forth of a few and indefinite rules, but instead they should be complete, clear, and concise to the last detail.

The following is a list of such instructions as should be prepared for the guidance of the entire organization. Illustrative detailed instructions under each are taken up in the same order, relating

1. To material to be inventoried.
2. To duties of the inventory personnel.
3. To the forms.
4. To preparing the plant for inventory.

Instructions Pertaining to Material to Be Inventoried.—An inventory force is organized to count, measure, weigh, price, and tabulate such materials in the plant, or where otherwise located, as are known as direct and indirect materials. The inventory should not include any production machines, factory equipment,

or office equipment, otherwise known as items of plant. Each person participating in the inventory should be so instructed that there may be no question at any time as to what is or what is not direct or indirect material. The following are definitions of direct and indirect material.

Definition of Direct Material.—Direct material for inventory purposes may be defined as that material which enters into and becomes a part of the finished product. Direct material for a metal-working concern, for example may be found in the following conditions:

1. Bar stock, sheet metal, wire, structural shapes, pig metal, etc.
2. Rough castings, forgings, and stampings.
3. Component parts-in-process but not completed.
4. Finished parts purchased or manufactured.
5. Assemblies-in-process but not completed.
6. Finished assemblies purchased or manufactured.
7. Products-in-process of assembly.
8. Finished products.

Definition of Indirect Material.—Indirect material, otherwise known as operating, maintenance, and repair supplies, is that material which does not enter into or become an integral part of the product, but is necessary, however, to the proper operation and maintenance of the concern. Indirect materials are many and varied and will generally be found in the same condition as when received from vendors. Indirect materials, distinguished from capital items, are those materials which are consumed or used up within a comparatively short time, and have a short life when compared with manufacturing equipment and plant items. A few examples of indirect materials are:

1. Coal and coke.
2. Oils, greases, and other lubricants.
3. Small unused tools such as hammers, cutters, reamers, drills, etc.
4. Electrical supplies.
5. Plumber's supplies.
6. Mill wright's supplies.

Material Not Readily Identified.—From time to time during the actual taking of an inventory, tag writers are required to count or weigh material in a raw condition which is not easily identified as being direct or indirect material. For example, bar

stock as *direct material* may be used in the manufacture of component parts; bar stock as *indirect material* may be used in making tools or on machine repairs. In the first case the material should be reported on the inventory tag as direct material; in the second case, as indirect material. When any material is encountered concerning which there is doubt as to its being direct or indirect, the tag writer should ask advice from an inspector. In case the inspector is unable to decide satisfactorily the question, it is then necessary for the tag writer to report on the inventory tag in the "Kind of Material" section, the word "uncertain" and it then falls to the lot of the clearing house checkers, by reference to their various bills of material, to settle the matter, keeping in mind the location in which the material has been inventoried. The location has an important bearing on the matter as in all probability material found in indirect material stores can hardly be classified other than indirect material. Questions of this nature arise in the majority of cases where raw material is located in the operating departments and not marked with any identifying lot or job number. Cases of this nature may be satisfactorily settled by intelligently tracing through the various bills of material or jobs or lots in process.

Obsolete Direct Material.—Obsolete direct material may be described as material on hand, which although purchased or manufactured for a specific purpose, or model, or kind of product, is no longer in current use by the company. This material may be found in rough, semifinished, or finished condition. There are three considerations concerning obsolete direct material:

1. It may not be in current use but may be adapted for spare parts on models or product no longer manufactured.
2. It may be changed and used as a part of the present products.
3. It may have no value other than scrap.

In the first instance cost should be considered in pricing for inventory purposes. If not full cost then the cost less a reasonable amount for depreciation should be used. In the second instance this material may be priced on the same basis as raw material used in the part to which this material is to be changed. In the third instance if no market may be found for its sale elsewhere, this material should be removed from all storerooms and manufacturing departments prior to the inventory and placed in

scrap piles and inventoried as such. Identification prior to the day of the inventory of obsolete material to be inventoried as "scrap" should be done by the inspection division and the material so marked.

Obsolete Indirect Material.—Obsolete indirect material may be defined as material on hand which, although purchased for a specific purpose, cannot be used to advantage by the concern. This class of material applies principally to consumable tools such as cutters, drills, reamers, etc., which were purchased for the manufacture of models or products which have been discontinued, or for the manufacture of parts of current models or products which have been superceded by other parts requiring different tools. Obsolete tools of this nature usually have no value to a concern other than scrap unless disposition to other concerns, who can use them, may be effected.

Salvage Material.—Salvage material is commonly confused with the term "scrap." *Salvage*, as distinguished from scrap, is that damaged or spoiled material which, by the application of corrective labor, may be brought back to a usable condition again. For some slight defect material may be rejected by the inspectors for use in the product. This slight defect does not necessarily make the material scrap, for it may be repaired or remachined and made good again. Salvage material, however, before being repaired, does not have the same value as good material and hence in pricing it this element must be taken into consideration.

Scrap.—Scrap is generally inventoried by estimate and approximation except where it may be conveniently weighed, counted, or measured. As stated elsewhere, scrap should be segregated and piled by various kinds of material, such as gray iron, steel, aluminum, wrought iron, babbitt, copper, brass, rubber, and others. In pricing such scrap, current prices prevailing at the time of the inventory are used.

Consumable Tools.—Cutters, drills, reamers, taps, etc. are consumable tools, and should be included in the inventory provided they are found new and unused in the following places:

1. Tool cribs.
2. Master cribs.
3. Stores.
4. Receiving Department (see Material in Transit).
5. On invoices of Material in Transit.

Any tools found on work benches or in machines should not be inventoried. Tools, such as drills and files resharpened or recut by outside concerns, which have yet to be issued and used, should of course be inventoried, but not priced at their original cost. The price should be the unit cost of resharpening or recutting. Any tools found in the tool cribs or stores which *have* been used should not be inventoried because it is customary to charge them off at the time of their first issue.

Obsolete Tools.—Obsolete tools in the same condition as when purchased found in the tool cribs or stores are usually inventoried. The inventory tag should describe if possible for what use or purpose the articles were acquired. Inventory tags applicable to those tools are used many times for preparing a list of obsolete tools for the purchasing department. This schedule, if properly arranged, assists that department in disposing of these tools at the best possible prices.

List of Consumable Tools.—In order to avoid uncertainty concerning what tools are, and what tools are not, to be considered as consumable, a list of all consumable tools should be prepared. This list is called "Indirect Material—Consumable Tools" and shows the following concerning each item:

1. Name of tool.
2. Unit.
3. Full description.

Such equipment not found on this list must not be inventoried except where the list happens to be incomplete. If such an instance occurs, the approval of the inventory supervisor is required before the article may be inventoried as indirect material.

Inventory of Certain Material and Supplies.—Because of their bulk and location, and because the expense of an actual count or weight would be far out of proportion to the value of the material, certain materials must be inventoried by estimate and approximation. This does not mean that a rough guess should be made of the quantity of the material in question. Instead, it means that consideration should be given to all necessary measurements, and from these a result obtained that approximates very closely what would result if the material were actually weighed or counted. The list below is representa-

tive, showing materials that ordinarily must be inventoried by estimate and approximation.

1. All metal scrap used for foundry purposes.
2. Core sand.
3. Molding sand.
4. Miscellaneous foundry sands.
5. Foundry coke.
6. Pig iron
7. Limestone.
8. Coal for power and heating purposes.

Packing and Shipping Supplies.—All material used for the packing of shipments outward, and all supplies incidental thereto, should be considered as indirect material. Wrappers, cartons, boxes, etc., which are sold with the product at the time of its final retail sale, are generally considered not as indirect, but as direct materials.

Rejected Material Subject to Return to Vendor.—During the inventory certain materials will be found which, because they have been rejected upon inspection or found defective during their processing, are subject to return to the vendors thereof. It is the custom for certain manufacturers to allow this kind of material to be returned for credit or replacement. Rejected material of this nature should not be included in the final inventory figures, but may be used in reconciling the physical inventory with the book inventory. If instructions are issued to report this material then the inventory tag must differentiate between this material and good material. Although rejected material is not included in the final inventory figures, it may be necessary to price it, depending upon the status of the accounting records. Whether the tags are to be priced or not may be governed by the following conditions:

1. If the book inventory has not been reduced by this material and it is still recorded on the company's books at cost, it will be necessary to price the tags in order properly to reconcile the physical inventory with the book inventory.

2. If the book inventory has been reduced by the cost of this rejected material by reason of the various vendors being debited and the book inventory credited, these inventory tags need not be priced. A schedule should be made of such material in order that the purchasing department may have any up-to-date record of it.

If instructions with respect to the preparation of the plant for inventory have been properly carried out, all rejected material subject to return to the vendor will have been segregated and tagged for identification purposes. All inventory tags on which this material is recorded should be stamped "This Material Rejected."

Same Part Made from Different Kinds of Material.—By reason of changes in specifications, the same part of a product may be made from different kinds of material. When the cost of the respective materials is approximately the same no great error will be occasioned if no note is made on the inventory tag of the material specifications. Where, however, the cost of one material may greatly exceed the cost of another it is necessary that careful attention be given to this matter when inventorying. Probably the best method by means of which material of this nature may be accurately reported on the inventory tag is to direct the inspectors to segregate and identify such material prior to the start of the inventory. If this is properly done, the tag writers should have no difficulty in reporting a complete description on the inventory tag. Accurate pricing will result from complete description.

Bar Stock Issued against Lot Number.—Bar stock or structural shapes which have been issued from stores for manufacture should have attached to it prior to the inventory an identification tag showing the following information:

1. Part number which is to be made from the bar stock.
2. Lot number.
3. Quantity of parts to be made.
4. Location.

Bar stock issued for the manufacture of a lot of a certain part, upon which no operations have been performed, should be considered for inventory purposes as work-in-process and inventoried on a Work-in-Process tag. Although no labor has been expended on the material to change its form, the delivery of raw material from stores against a certain lot number is usually considered as necessary for the first operation.

Wherever bar stock is found within the manufacturing buildings, it is essential, therefore, to determine if it applies to a certain lot number of a certain part. In writing the inventory tag for material found in this condition the tag writer should report the

part number which is to be made from the material, the location, the lot number, and the lot size. In addition, within the space provided for "Description," he should show the kind of bar stock, its size, and the number of feet.

Bar Stock in Automatics at the Time of Inventory.—Under ordinary conditions automatic screw machines and other automatics may have unfinished lots in operation at the start of the inventory. This condition is bound to exist in spite of the attempt on the part of the operating departments to taper off production a few days prior to the start of the inventory. In such automatics as have unfinished lots in process, material will be found in two conditions:

1. Finished but uninspected parts.
2. Unused portion of the bar stock.

In inventorying material pertaining to a lot in this condition, difficulty in pricing will be caused if the lot is split so far as the *status* of the material is concerned. In order to reduce this possibility of error to a minimum, all lots run on automatics should be finished if possible by the time the inventory commences. In order to do this it may be necessary to run parts, which are processed in small lots, during the two or three days prior to the inventory. Should the operator of an automatic or group of automatics complete his lots before the close of the last day prior to the inventory, he should be allowed to use the remaining time to clean up his machines or take on a portion of a lot which is being run on other automatics. In any event every effort should be exerted to have the automatics clear and the lots completed before the inventory starts. This will save time and confusion in the counting, checking, and pricing.

Purchased Material in Transit—Inward.—In order that the inventory may include all materials and supplies known as Material in Transit, the following rules should be followed:

1. Purchased materials and supplies not received prior to the first day of the inventory, invoices for which *are* received prior to the first day of the inventory and entered as "Accounts Payable," should be included in the inventory. Such invoices should be stamped "Purchased Material in Transit—Included in the 19—Inventory." These invoices should be tabulated and included with the physical inventory figures.

2. Purchased materials and supplies, invoices for which are received prior to the first day of the inventory, which are not unloaded, unpacked, or inspected until after the inventory, should be inventoried from invoices in the same manner as above.

3. Purchased materials and supplies received prior to the first day of the inventory, invoices covering which are not received, should be inventoried in the same manner as if invoices have been received. These materials and supplies should be transferred prior to the inventory to stores where the physical inventory will then be increased by the amount of the cost of these items without any increase in the book inventory. Because invoices for these materials are not received and recorded, it is necessary, as far as the books are concerned, to make an adjusting entry establishing these items in the book inventory with offsets of "Accounts Payable." This entry may later be reversed and the invoices (when received) vouchered, and accounted for in the usual manner.

4. Factory and production equipment such as jigs, fixtures, patterns, etc. should not be considered as purchased material in transit, and should not be taken into the inventory.

In order to determine whether or not purchased materials or supplies are to be included as "Material in Transit" and added to the physical inventory, the following procedure should be followed:

1. The accounting department should prepare a list of all invoices in their files which are being held awaiting the regular receiving and inspection slips. This list should show the voucher number, invoice number, invoice date, purchase order number, vendor's name, description of material, quantity, unit price, and extension applicable to each invoice.

2. This list, when completed, should be forwarded to the receiving department. The receiving department by comparing their files with this list, should determine whether the material pertaining to each invoice has been received, inspected, and transferred to stores. Such information should be noted opposite each individual invoice on the list as prepared by the accounting department. Items marked "Received" should not be considered as "Material in Transit," because such material will be inventoried physically in the various stores to which it has been transferred. When material is found to have been received and inspected, or only received, this fact should be noted opposite the respective invoices on the list, and if such material has not been transferred to stores, the invoices should be considered as "Material in Transit" and included in the inventory of "Material in Transit." If

any material pertaining to specific invoices has not been received, it should be considered as "Material in Transit."

3. During the inventory period the receiving department should not transfer any material or supplies to stores, but should hold such materials and supplies until after the completion of the inventory. This will prevent duplications that might otherwise occur. All materials and supplies received in the plant after the inventory commences should be held in bond in the receiving department.

4. The schedule of invoices prepared by the accounting department and checked by the receiving department should be forwarded to the inventory supervisor in order that all material in transit may be totaled and included in the inventory.

Procedure with Regard to Shipments during Inventory.— It is a cardinal rule in stock-taking that no material must be moved or transferred from the time the inventory commences until it is completed. However, in certain exceptional cases it may be necessary to ship parts during the inventory period. As the shipping of material during that time affords an opportunity for duplication or omission in the physical count, a procedure similar to the following may well be used:

1. A large force of counters and tag writers should be assigned to the finished parts stores on the first day of the inventory in order that the count may be completed as quickly as possible.

2. At the time material is to be taken from stock for shipment, it may or may not have been counted. If it has been counted prior to withdrawal of stock for shipping purposes it will not be necessary to take cognizance of the quantity shipped so far as the physical inventory count is concerned. However, if the material has not been counted at the time it is withdrawn for shipment, the following procedure should be adopted:

a. A Shipment Inventory tag (see next page) should be inserted in the bin tag holder, or, if the material is not in bins it should be attached to the material. On the tag should be written the part number, the quantity withdrawn, the date, and the signature of the tag writer. It will be an easy matter to determine whether or not the material has been counted by the presence or absence of the inventory tag stub attached to the material.

b. In order to prevent material, which has been withdrawn from bins not counted at the time of the withdrawal, from being inventoried, the lower portion of the Shipment Inventory tag must be attached to the material withdrawn, indicating that it has been accounted for once.

c. When the material remaining in the bin is finally counted the quantity shown on the Shipment Inventory tag is added to the quantity actually counted in the bin and an inventory tag written for a quantity equalling the actual count plus the quantity shipped.

d. The inventory tag stub, as in all other cases, should be attached to the material. The Shipment Inventory tag remains with

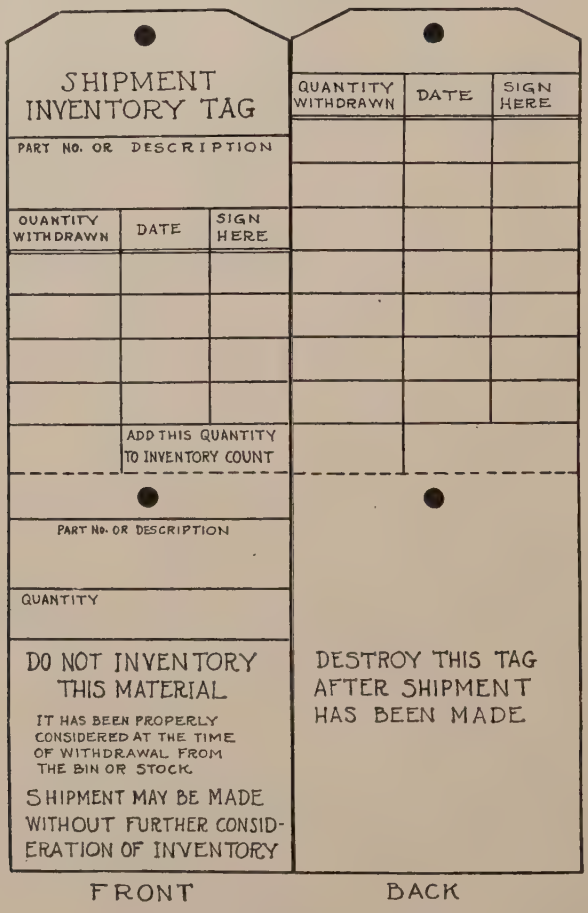


FIG. 2.—Shipment inventory tag.

the stub of the inventory tag and should not be removed until the inventory has been completed and final release given to the finished parts stores.

If the material has been counted prior to withdrawal of stock for shipping purposes, the material to be shipped must be so

identified that it will not be inventoried twice. The Shipment Inventory tag will also be attached to this material but the upper portion of the tag should not be left in the bin. The lower portion of the tag only should be used and it remains attached until the material has been shipped. At that time it is destroyed.

Material on Consignment in Transit—Outward.—Material shipped out *on consignment* prior to the inventory, but still in transit on the first day of the inventory, must be carefully accounted for in order to prevent duplications or omissions in the physical count. To determine exactly what material should be classified as Consigned Material in Transit—Outward, and included in the inventory, this procedure should be followed:

1. The accounting department should prepare a schedule of all consigned material outward from the billings of all material shipped on consignment during a reasonable time prior to the commencement of the inventory.

2. All consignees should be instructed prior to the inventory that they should not place in stock any material received on the first day of the inventory or thereafter, until the entire inventory is completed. Material received during the inventory should not be counted or included with other stock, but should remain unpacked or unboxed.

3. Consignees should be instructed to place in stock only consigned material received *prior* to the inventory.

4. Consignees should be instructed to inventory all consigned material received by them prior to the inventory and on hand the day the inventory commences.

5. Consignees should be instructed to render the following reports to the inventory supervisor:

a. "Schedule of Invoices—Consignments," showing the numbers and dates of all invoices for consigned material which they have received over a period of one week prior to the inventory and have placed in stock and inventoried. The dates when the material was received should also be shown by the consignee.

b. A tabulation of the inventory of materials on consignment.

6. Upon receipt of the "Schedule of Invoices—Consignments" from consignees, the inventory supervisor should deliver these schedules to the accounting department. This department should then compare the schedules with their own statement of "Consigned Material —Outward," as explained in the first paragraph, noting opposite each item on the schedule if it was received prior to the first day of the inventory by the consignee. Such shipments not received by the consignee prior to the first day of the inventory should be considered as "Material on Consignment in Transit—Outward."

Accounting Procedure with Regard to Shipments Outward during the Inventory.—In order that there may be no confusion between inventory and accounts receivable, the accounting department should be governed by these instructions:

1. All material shipped prior to the start of the inventory may be billed without affecting the accuracy of the inventory figures. Invoice dates, however, must be prior to the start of the inventory.
2. Material packed for shipment prior to the inventory day but shipped during the inventory should be billed and dated in the same manner as above.
3. Material removed from departments or stores during the inventory may be packed and shipped during that period, provided the shipping order bears the approval of the inventory supervisor, and provided further that this material reaches the packing and shipping department with its Shipment Inventory tag attached. That this material has been inventoried is evidenced by the Shipment Inventory tag, and a duplication of assets will occur unless the billing is made subsequent to the inventory.

Materials to Be Inventoried—Locations.—Practically without exception, all material will be found at the following locations:

1. Main plant.
2. Subsidiary plants:
   a. Domestic. *b.* Foreign.
3. Branch houses:
   a. Domestic. *b.* Foreign.
4. Distributing points:
   a. Domestic. *b.* Foreign.
5. Dealers, distributors, and agents (material on consignment):
   a. Domestic. *b.* Foreign.
6. Public warehouses.
7. Material in transit:
   a. Purchased material—inward.
   b. Consigned material (owned by company)—inward.
   c. Consigned material (owned by company)—from one consignee to another.
   d. Consigned material (owned by company)—outward.
8. At plants of other concerns who are performing work on material consigned to them by company.
9. At places where experimental work is being done.
10. At exhibitions, fairs, and permanent or temporary industrial shows.
11. At plants of other concerns who are holding rejected product for return.

Wherever material is located on inventory date it should be counted and reported as of that location. It should not be combined with identical material located elsewhere and reported on *one* inventory tag. This applies especially in the instance of material located at several points in a department or stores.

Items That Should Not Be Included in the Inventory.—The following items should not be included in the inventory:

1. Material held on consignment for others.
2. Material on consignment for manufacture or repair.
3. Defective material rejected upon inspection, or found defective in process, awaiting return to vendors.
4. Equipment consigned from other manufacturers for experimental work.
5. Product, parts, or material sold and billed, but held for future delivery.
6. Advances in cash made on account of purchase contracts.
7. Capital items.
8. Used indirect materials and supplies.
9. Used consumable tools.

Instructions Pertaining to Duties of the Inventory Personnel.—Instructions prepared for the members of the inventory organization should be distributed at least two or three weeks before the inventory. Each employee should be advised to read these carefully, and to make note of those things that are not entirely clear. After allowing a few days for employees to familiarize themselves with the instructions, the inventory supervisor should then commence a series of meetings with the organization as planned. At these meetings he should explain not only the whole scheme of inventory taking, but also answer questions which any of the employees may care to ask relative to any procedure.

The first meeting to be called by the inventory supervisor should be that of the division chiefs. At this meeting all procedures and instructions applicable to the inventory should be read. At the finish of the reading any questions to be answered should be settled in general discussion. Stenographic notes should be taken of this meeting in order that any new instructions or procedures finally approved of, may be incorporated in the inventory manual and issued to those divisions affected by the new instructions or procedures. Division chiefs should meet

with the inventory supervisor at least three times prior to the inventory.

The next step for the inventory supervisor to take is that of calling general meetings for every division, with one exception —the counters. Notices showing dates for these meetings should be posted in conspicuous places throughout the plant. Naturally there is a tendency on the part of employees to disregard such instructions and fail to attend. In order to check the attendance the inventory supervisor should call the roll of those who should be present. Attendance should be made obligatory.

So many employees know so little concerning the purposes of an inventory that it is advisable for the inventory supervisor to explain briefly why it is vital that the inventory be correct. If the employees are thus taken into confidence they show far more interest than if they undertake their duties without such knowledge. Any questions concerning the general scheme of the inventory which they may bring up after the inventory supervisor has addressed them should be answered for the benefit of all others who are in attendance.

Illustrating Forms.—If the place where the meetings are held permits, a screen should be installed upon which lantern slides of the various forms may be shown.

It is an easy matter for the supervisor to obtain lantern slides of all inventory forms properly filled in. At each division meeting these forms should be thrown upon the screen and fully explained. Any questions submitted by the employees should be answered at once by the inventory supervisor. Slides have been found a most effective way of showing exactly how the forms should be used.

In addition to lantern slides of the forms, other slides should be prepared showing the organization chart of the inventory and the routing of the inventory tag from its issue until it has been filed as a permanent record. In explaining the organization chart the supervisor has an excellent opportunity to arouse interest on the part of his audience by uncovering the workings of the whole organization. The routing chart on the other hand explains exactly the course the tag takes through the organization, and each person in attendance sees exactly where his duties fit in. Too much stress cannot be placed upon the idea of graphically illustrating to employees all important matters pertaining to the inventory.

Sample Forms Should Be Supplied.—In addition to the instructions given in connection with the lantern slides, each member of the inventory organization, with the exception of the counters, should receive samples of the forms they are to use prior to the inventory. These forms should contain exactly the same information as will be expected during the inventory. If the number of sample forms is large, copies may best be made on some duplicating machine.

Assignment Lists.—The inventory supervisor should select with great care employees who are to participate in the inventory and endeavor to assign the more capable men to the difficult and responsible positions. When all members of the organization have been selected, assignment lists should be prepared and posted in conspicuous places throughout the plant. These assignment lists should be arranged in two ways:

1. The first assignment list should show the names of the entire personnel of the inventory organization and should be arranged alphabetically. In addition to the name, this list should show the clock number of the employee, his inventory function, to whom he should report, the station of each person on the first day of the inventory, and with what instructions they should become familiar. A representative assignment list arranged in this order will be found on another page.
2. The second assignment list should give the same information as the first list except that the names should be grouped alphabetically under the separate divisions of the inventory organization.

It has been found advantageous in certain plants not to include the names of the counters on the assignment list. By eliminating counters from the list much annoyance for the foremen and the employment department is prevented. Where the entire number of the factory workers is not to be used for the inventory, trouble has been caused many times by those who wish to participate in the inventory who have not been selected. It is best to notify the counters of their participation in the inventory individually and not by posted lists or notices.

The inventory supervisor should never allow assignment lists to be posted during working hours, as this results in confusion and loss of time on the part of the employees. So far as the office employees are concerned the assignment list should be posted at least three weeks prior to the inventory.

Because certain executives are permitted to obtain exemption from participation in the inventory for certain of their employees, assignment lists will have to be corrected from time to time. In order to avoid any misunderstanding it is well to notify each member of the organization by an interdepartment letter and obtain a receipt therefor to the effect that the notification has been received.

Instructions for Inventory Personnel.—Every employee who is to participate in the inventory should be furnished with a set of *written* instructions. These should be complete in every detail, for otherwise essential matters may be left open to arbitrary action, with resulting lack of uniformity.

The following instructions for each inventory division, taken from the inventory manual of a prominent manufacturing concern, are quite comprehensive. With such minor modifications as are required, these may well be adopted by most concerns.

Physical Count Division—Instructions for Department Chiefs.

1. You have been assigned as a department chief in the physical count division. Your duties shall be to supervise the counting, weighing, and measuring of materials in the department to which you have been assigned.

2. You shall be under the direction of the chief of the physical count division and any questions which arise relative to matters pertaining to your work shall be taken up with him personally.

3. To perform the actual work of counting you will have under your direction several men called "counters" whom you shall assign to work in groups. In selecting and grouping your men for the inventory endeavor to place the best men on the more difficult work. These groups of counters are to work in conjunction with tag writers assigned to your department to write inventory tags. Your men alone will perform the work of counting. Tag writers shall not count material. Their duties consist of recording the required information on the inventory tags.

4. Before the inventory commences you shall prepare your department in accordance with the instructions for preparing the plant, and any questions arising in carrying out such instructions shall be referred to the inventory supervisor at once.

5. Prior to the commencement of the inventory, you shall familiarize yourself with all instructions pertaining to the physical count division.

6. On the day and hour the inventory commences you shall report to the department to which you have been assigned. Your men shall report to you at that time and you shall at once divide them into

groups of five or six men. One tag writer shall be assigned by the chief tag writer in your department to work with each group.

7. You shall instruct your counters to count, weigh, or measure in an orderly manner, commencing from designated places in your department and working with steady progress down the respective aisles. By proceeding in this way there will be little opportunity of material being overlooked.

8. When all material in your department has been counted and tagged, it may be necessary to transfer your various counters to other departments. Transfers, however, shall not be effected until you have received proper notification from the inventory supervisor. It is essential that these instructions be rigidly adhered to as it is necessary for the inventory supervisor to know at all times where every man in his organization is located.

9. In order to assist your counters in reporting correct information to the tag writers several inspectors under the direction of the chief of the inspection division have been assigned to your department. These inspectors shall assist you and your counters in all possible ways.

10. From the start of the inventory until your department has been released for operation you shall allow no machines to run, nor permit any material to be moved in or out of, or about your department unless you have written instructions signed by the inventory supervisor directing you to do otherwise.

11. After all material in your department has been counted and tagged you shall proceed through the department and inspect every tag stub, noting the quantity written thereon. You shall then compare the quantity reported with an estimate which you shall make mentally. It is not necessary to count the pile or lot of material again but it is intended that you calculate as closely as possible how many pieces are in the pile or bin, and then compare your estimate with the quantity shown on the inventory tag attached. In this way large errors in quantity will be promptly discovered before the inventory tags are checked and priced.

Physical Count Division—Instructions for Counters.—Instructions for the counters should be a combined notification of their participation in the inventory, where, and to whom they are to report, and what they are to do. The following illustrates:

Employee's Name.....
Employee's Clock No.....

1. You have been assigned as a *counter* during the inventory.

2. On the day the inventory commences you shall report at 7 a. m. to the chief counter in the department to which you have been assigned.

3. You shall then be assigned by him to count, weigh, or measure material in certain locations.

4. Your count must be a correct count of the material in order that the tag writers may get correct information.

5. Be sure to report the correct part number to the tag writers.

6. Don't hestiate to call for the chief counter if you find material with no part number. Don't take any chances. Be sure that the part number and the part name are correct.

7. Give the tag writer all the information you can.

8. In weighing material be sure to read the scale correctly. Verify the weight a second time by reading the scales again after reporting to the tag writer.

9. Pile material neatly and replace material in bins carefully.

10. *Be sure to count correctly.*

11. On the first day of the inventory report to:

Department Chief Counter .....
Building ..... Department .....

Inspection Division—Instructions for Inspectors.—The following instructions originating from the office of the inventory supervisor should be in the hands of each inspector at least two weeks prior to the day on which the inventory is to commence. These instructions should be approved by the factory manager and the chief of the inspection and classification division before being issued. Inspectors' duties may be divided into two sections—the first dealing with those duties before inventory, and the second dealing with duties during inventory.

Instructions.—You have been assigned as an inspector in the inspection and classification division. Your duties shall consist of advising tag writers and counters and furnishing them with such information as will properly describe materials on inventory tags. The details of your duties below are divided into those you shall perform prior to the inventory, and those you shall perform during inventory:

Duties Prior to the Inventory.

1. You shall proceed through the plant with representatives of other departments and designate materials which are *not* to be inventoried. This designation shall be made by attaching a Not to Be Inventoried tag to the material. Material not to be inventoried may fall within the following classes:

a. Material on consignment for others.

b. Material on consignment for manufacture or repair.

c. Defective material rejected upon inspection or found defective in process, awaiting return to vendors.

d. Consigned equipment from other manufacturers for experimental work.

e. Products, parts, or material sold and billed but held for future delivery.

On the reverse side of the "Not to be Inventoried" tag you shall give a complete description of the material which is not to be taken into the inventory, in order that its identity can always be established should the occasion arise.

2. You shall inspect obsolete and spoiled materials and arrange for proper disposition prior to the inventory.

3. You shall identify and mark all material that can be salvaged. Your attention is called to the following with respect to salvage material: "One of the difficulties which arose during past inventories was caused

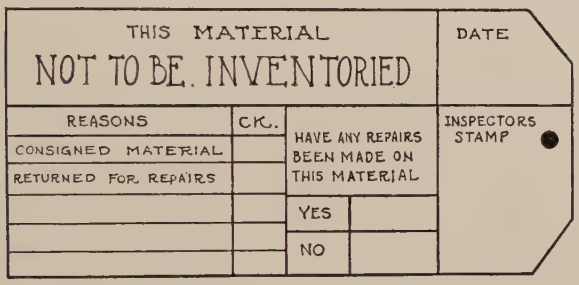


FIG. 3.—Material not to be inventoried tag.

by a lack of knowledge as to what salvage material consisted of. In many cases *salvage* was reported on the inventory tag as *scrap* and for this reason errors in pricing resulted. This year it is planned to take advantage of the experience of past years. You are therefore instructed to designate as *salvage,* any material which can be brought back to usable condition again by the application of corrective labor."

4. You shall plan your work prior to the inventory so that no parts or material will remain in the inspection cribs. If necessary, you shall work overtime on the day prior to the inventory to inspect parts or materials completed that day by the operating departments. Such parts or material shall be transferred to the finished parts stores before inventory.

5. Prior to the inventory you shall be responsible for directing the segregation and identification of parts or components of the same part number or size, made from different materials.

Duties During the Inventory.

1. On the day the inventory commences you shall report at your designated station and furnish information to the various chief tag writers, tag writers, and counters.

2. Operation sheets, assembly lists, and such other forms and supplies will be furnished to you.

3. You shall familiarize yourself with all instructions, not only concerning materials to be inventoried, but also procedures for special cases.

4. You shall advise concerning obsolete material encountered in the inventory and certify to your inspection thereof by placing an impression of your identification stamp on the inventory tag.

5. You shall pass upon all salvage material by making a certification as described above.

6. Whenever requested by the tag writers or counters you shall advise them concerning part numbers, part names, assembly numbers, assembly names, kinds of material, etc.

7. You shall determine what operations have been performed on parts in process, and shall certify to your inspection thereof by impressing your identification stamp on the inventory tag. To assist in determining what operations have been completed, lists will be furnished you.

8. With respect to assemblies-in-process you shall indicate on the assembly lists the parts and the quantity of each found in the assembly, and in addition, the number of labor hours that have been expended in assembling the parts making up the assembly-in-process.

9. You shall endeavor to work as closely as possible with the various counters and tag writers in order that their time may be conserved. As each tag writer is to work in conjunction with five or six counters a great deal of time may be lost unless you are at hand to advise them promptly.

10. Where bar stock or structural shapes have been issued from stores against a lot or job number, but no labor has been expended on it for converting such material into parts, instruct the tag writers to classify such material as "Parts-in-process." The inventory tag, however, must show that no operations have been performed.

11. No one is to be transferred from one department to another unless approval has been given by the inventory supervisor. You shall remain in the department to which you have been assigned until you receive instructions notifying you of transfer.

Instructions for Department Chief Tag Writers.

1. On the day the inventory starts you shall report to the custodian in the clearing house at least 15 minutes before the hour set for commencing the count. At that time he will issue to you for the use of your tag writers, inventory tags and all necessary supplies.

2. Attached to the block of inventory tags which you are to use, you will find an Inventory Tag Delivery Slip. After you have satisfied yourself by checking the tag numbers that all tags are accounted for, you shall sign this slip. You will then be held accountable for these inventory tags until such time as you have returned all of them to the custodian.

3. Whenever during the inventory you return tags to the custodian you will receive, for such delivery, a receipt which cancels your responsibility for those tags returned.

4. When you have received your tags and other necessary supplies from the custodian you shall proceed at once to your assigned department where your tag writers will be waiting to commence their work. You shall then distribute inventory tags and necessary supplies to them and assign them to work in conjunction with counters.

5. When distributing inventory tags to your tag writers it is not advisable to issue more than 25 tags at a time to one tag writer. By keeping the issue down to this quantity it will help you to prevent tags getting lost or mutilated; and hence allow you to account more easily for the tags you are held responsible for.

6. Once your tag writers have started to work you shall examine the tags that they have written to determine whether or not they are recording the information properly and correctly. This examination should be done just as soon as possible after the work gets under way as it will save a great deal of time and trouble if you get your men started properly.

7. You shall distribute tags in numerical sequence, and you shall require your tag writers to return them in the same order.

8. From time to time you must return completed inventory tags to the clearing house, and in return you will receive a receipt therefor from the custodian. Additional tags that you may require will be furnished by the custodian. For these you shall sign a receipt in the same manner as the original issue.

9. *You shall account for every tag whether it is used, unused or voided.* In order that you may know to whom you have issued tags you shall use the Chief Tag Writers' Inventory Tag Sheet.

10. At the end of each day you shall return to the custodian all completed tags for which he will give a receipt. In addition you shall deliver to him for protection during the evening all your unused inventory tags. The unused inventory tags shall be placed in individual envelopes by each tag writer at the end of each day. On the following morning the custodian will return these envelopes to you and you shall then distribute them to your tag writers in order that they may commence work where they left off on the previous day. Tags which have not been attached to material shall not be left in your department during the night.

11. If you have been assigned to a department in which more than one class of material may be found, you shall assure yourself that the tag writer is using the proper inventory tag. If you are assigned to a department in which assemblies-in-process are to be inventoried you shall require that each inventory tag reporting assemblies-in-process be accompanied by its respective assembly sheet. The custodian has been instructed not to accept assembly-in-process inventory tags unless accompanied by both the assembly sheet envelope and the assembly sheet.

12. You shall not transfer any of your tag writers to other departments unless you receive a written notice to do so from the inventory supervisor.

13. When the department to which you have been assigned has been completely inventoried and the tag writers are to be transferred elsewhere, you shall not release them until they have returned (and you have accounted for) all inventory tags and supplies. You must bear in mind the fact that *you* are accountable for every tag issued to *you*, and that you must return all tags to the custodian before you shall be released of your responsibility.

14. If additional tag writers are required in your department or if too many have been assigned to you, you shall notify the chief of the tag-writing division.

15. Before returning any tags to the clearing house you shall examine each one to determine if it has been filled out correctly. This will save a great deal of time on the part of the checkers and tag correctors.

Instructions for Tag Writers.—1. On the day and hour the inventory commences you shall be at your station as designated on the assignment list and shall report to your chief tag writer. You shall remain under his supervision until you are transferred elsewhere.

2. After reporting you shall be supplied with inventory tags and all necessary supplies.

3. You shall then be assigned to work in conjunction with a group of counters whose duties will be that of counting, weighing and measuring materials. Your function shall be that of writing the inventory tags. It is intended that you shall not handle or count any of the material. Therefore your time is to be devoted entirely to the recording of accurate data pertaining to all materials which are counted by the counters.

4. Because the counters are not qualified to give complete and accurate data in all cases, inspectors have been assigned to each department. They have been instructed to give you all possible assistance in properly classifying, designating, and recording inventory information. It shall be your duty to call upon these inspectors where there is the least question in your mind concerning any material. It is desired

to call your attention to the fact that the inventory will be as accurate as you make it, and unless the information recorded is correct the results obtained will be incorrect.

5. The chief counter in the department to which you have been assigned is also familiar with the product of that department. It may be advisable at times to request information from him. You are urged to do this whenever you consider it necessary.

6. Every tag that you have is charged to you and you shall be held strictly accountable for its return.

7. Under no circumstances shall any tag be destroyed, lost, loaned to or borrowed from another tag writer.

8. All void, unused, spoiled, and cancelled tags shall be returned by you to your chief tag writer.

9. If tags are spoiled in writing you shall write the word "void" across the front face and return them to your chief tag writer in the same manner as good tags.

10. Tags that you have completed shall be returned to your chief tag writer from time to time. In turn he shall furnish you with additional blank tags.

11. When material has been counted, weighed, or measured and you have written an inventory tag therefor, you shall have the tag stub securely wired to such material as a means of identification.

12. At the start of the inventory you may not feel sure that you are writing the tags correctly. To satisfy yourself, you shall submit the first few tags written to your chief tag writer before proceeding further.

13. All tags charged to you shall be properly protected at all times. During lunch hour or at any time during the day you shall not leave your tags where they may be stolen, lost, or mutilated. Your attention is directed to the penalty imposed for losing inventory tags.

14. In order that your tags may be protected during the evening you shall place all such unused inventory tags and forms which you have at the end of the day, in your tag-writer's envelope. You shall then hand such envelope to your chief tag writer. At the same time you shall hand him tags which have been written by you. From the time you hand your envelope to your chief at the end of the day until the commencement of work the following morning you shall not be accountable for the tags. On the following morning your envelope containing the unused inventory tags (in the same condition as when you turned them over to the chief tag writer on the evening before) shall be returned to you and you shall continue your work as though no interruption had occurred.

15. You must keep in mind this fact, that the chief tag writer shall receive from you at the end of the day all tags which you have completed, and that the envelope which you shall hand him for safe keeping

during the evening shall contain only those forms which have been unused.

16. Prior to the inventory you shall familiarize yourself with definitions concerning the following materials:

a. Direct material.
b. Indirect material.
c. Material not easily identified.
d. Obsolete direct material.
e. Obsolete indirect material.
f. Salvage material.
g. Scrap.

17. You shall also familiarize yourself prior to the inventory with all forms that you shall be required to use.

18. One inventory tag only shall be written for each lot of material. Each tag shall give the description of but one kind of material. The same part or component in different stages of completion shall be inventoried separately and so reported.

19. Reporting two or more kinds of material or parts on one tag is wrong, and under no conditions shall this be done.

20. You shall note that each inventory tag bears a serial number. You shall keep the tags in numerical sequence at all times. When the chief tag writer furnishes you with tags he shall arrange them in correct order. Upon your return of the tags to him, you shall do likewise.

21. If you have been assigned to departments in which assemblies are made, you shall follow the following instructions explicitly:

a. If the assembly is not complete you shall not wait until the inspector is ready to advise you, but instead you shall attach an Inspector's tag to the material and proceed with other work. This tag is notification to the inspector to attach an assembly sheet upon which is indicated the parts in the assembly and the hours of assembly labor already expended.

b. When the inspector has investigated the assembly-in-process, he attaches to the Inspector's tag an assembly-sheet envelope in which he has placed the assembly sheet. When this has been done, you shall return to such material, complete your inventory tag from the information contained on the assembly sheet, fill in the envelope, detach both the Inspector's tag and the envelope, and attach the stub of the inventory tag to the material. You shall place the number of the inventory tag on the envelope and also on the assembly sheet inside.

c. You shall examine the assembly sheet in order to satisfy yourself that the inspector has given the necessary information required.

d. Each and every inventory tag returned to your department chief tag writer upon which assemblies-in-process have been reported shall be accompanied by its respective assembly sheet and envelope.

22. Inventory tags shall be written in a uniform manner. You shall carry out the following instructions concerning information to be written by you on the inventory tags:

a. Location—Building.—Give the name of the building where the material is inventoried. If the material is found in the yard report the location as being near a certain building.

b. Location—Floor and Bay.—Give the floor number and also the bay number.

c. Location—Bin Number.—When material is found in a bin, report the bin number.

THIS ENVELOPE CONTAINS No._____

ASSEMBLY SHEETS FOR ASSEMBLY-IN-PROCESS

INSTRUCTIONS FOR INSPECTORS	INSTRUCTIONS FOR TAG WRITERS
1. FILL OUT ASSEMBLY SHEET. 2. PLACE ORIGINAL COPY IN THIS ENVELOPE 3. RETAIN COPY 4. ATTACH THIS ENVELOPE CONTAINING ORIGINAL COPY TO MATERIAL BY WIRING CLOSE TO INSPECTORS TAG FOUND ON ASSEMBLY. 5. STAMP YOUR NUMBER BELOW.	1. NOTE INSPECTORS NUMBER. 2. NOTE ASSEMBLY SHEET AND DETACH ENVELOPE. 3. FILL IN INVENTORY TAG. 4. MARK TAG NUMBER ON ENVELOPE. 5. REMOVE INSPECTORS TAG AND REPLACE WITH INVENTORY TAG 6. STAMP YOUR NUMBER ON ENVELOPE 7. FORWARD ENVELOPE WITH ASSEMBLY SHEET TO CLEARING HOUSE.
INSPECTORS STAMP	TAG WRITER STAMP

ASSEMBLY NAME AND NUMBER	LOCATION	INVENTORY TAG NUMBER

FIG. 4.—Envelope for assembly sheets.

d. Name of Material or Part.—Give the full name of the material or part inventoried. Do not abbreviate or do not give the shop term. The name to be used should correspond with the name on blue prints, bills of material and operation sheets.

e. Material or Part Number.—Give the part number and in addition any prefix or suffix letter which may attach to the number.

f. Kind of Material.—State whether the material is direct or indirect. Consider salvage and obsolete direct material as direct material. Scrap will be considered as indirect and so reported. If uncertain whether material is direct or indirect, write the word "uncertain" in this space.

g. Status of Material.—As this section is to be used in the case of reporting direct material only, describe the direct material inventoried in one of the following conditions:

(1) Raw or rough.
(2) Parts-in-process.
(3) Finished parts.
(4) Assemblies-in-process.
(5) Finished assemblies.
(6) Product-in-process.
(7) Finished product.
(8) Salvage.
(9) Obsolete.

h. Description.—In this section give all the information considered necessary for proper pricing. For example, shape, kind of material made from, use, etc. In reporting indirect material, this section should be used for giving the maker's name, maker's part number, and other important information required.

i. Size.—In this section give the size of the material making sure to report each necessary dimension. For parts, the size need not necessarily be reported but in the case of bar stock, sheets, wire, etc. and similar direct raw materials and in case of indirect materials, the size should be fully reported.

j. Model or Type.—If the material is applicable to a certain model or type, give such information in this section. If the material is common to several models, the word "common" should be written in this section.

k. Quantity.—Report the quantity counted, weighed, or measured in this section.

l. Unit or Measure.—The unit of count or measure shall be placed in this section. Care should be taken that the unit agrees with the unit by which the material is to be inventoried.

m. Operations which Have Been Completed.—In this section you shall give the names or numbers of all operations that have been completed. This section applies to the Work-in-process tags.

n. Last Operation Name or Number.—This section refers to the Work-in-process tag. Give the name and number of the last operation performed.

o. Machine at which Located.—For work-in-process give the number of the machine at which the material is located when inventoried. inventoried.

p. Lot or Job Number.—For material-in-process give the lot or job number in this section.

23. In reporting the material inventoried be sure to use the proper tag. Do not, for example, report indirect material on Direct Material tags.

24. You shall work in the department to which you have been assigned until instructed by the department chief tag writer that you are to be transferred. You must return all inventory tags, used or unused, and all supplies to him before you will be permitted to be transferred elsewhere. You shall not take any tags with you to your new assignment.

Instructions for Custodian.—The following instructions should be handed to the custodian at least a week before the inventory:

1. Your principal duty is to account for every inventory tag and to maintain such records as will permit you to know at all times their exact locations.

2. On the day prior to the inventory you will receive from the inventory supervisor all inventory tags that are to be used. These tags shall be serially numbered and you shall give the inventory supervisor a receipt therefor.

3. You will be responsible for issuing tags to all department chief tag writers, who in turn will render you a receipt from them. Before issuing any tags you shall satisfy yourself that every tag is numbered; and, in order that they may be more easily accounted for, you shall issue them in blocks of 25, 50, or 100.

4. You shall demand that every tag issued by you be returned.

5. It shall be your duty to so arrange your section of the clearing house that the work of distributing and receiving inventory tags may be done with the smallest amount of confusion. In this matter you shall arrange your distributing tables in such a way that department chief tag writers may have special stations to report to, both for receiving tags and returning them.

6. Because tag writers, inspectors, and others in the inventory organization will require forms, pencils, clips, wires and other inventory equipment, it shall be your duty to supply them.

7. You shall demand that each department chief tag writer sign the Inventory Tag Delivery Slip before allowing him to receive inventory tags.

8. Upon the return of inventory tags by department chief tag writers, you shall release them of accountability by giving them your signed Inventory Tag Receipt Slip.

9. When a department chief tag writer has returned *all* tags of an issue, you shall give him your signed Tag Writers' Final Clearance.

10. Before any receipts are signed for releasing accountability, you shall satisfy yourself that all tags are actually returned by an examination of the tag numbers.

11. When tags are returned you shall insist that they be arranged in numerical order so that your work of recording the return may be facilitated. You shall insist that inventory tags reporting assemblies-in-process shall be accompanied by their respective assembly-sheet envelopes, and you shall not release accountability until this is done.

12. Tags, returned to you from the various departments during the morning of the first day of the inventory, shall not be distributed by you to the direct material checkers or the indirect material checkers until you have allowed the chief of the clearing house to glance over these tags, in order that he may learn exactly what errors are being committed by the tag writers.

13. It shall be your duty to protect all inventory tags during the night. Therefore, you shall deposit the unused inventory tags, returned by the department chief tag writers, in the vault for the purpose of protection during the night. In addition, all inventory tags in the clearing house shall be placed in the vault. You shall make such arrangements as will prevent confusion on the following morning in returning tags either to the department chief tag writers or to the personnel of the clearing house.

14. Before distributing tags to the checkers in the clearing house you shall lay aside those tags returned *unused* or *void*.

15. When all tags have been returned to you and accounted for, you shall prepare a report for the inventory supervisor, showing the total number of tags unissued, and the number of tags issued and returned. The number of tags issued and returned shall be analyzed as to the following:

a. Tags used.
b. Tags unused.
c. Tags voided.

16. All records maintained by you during the inventory shall be completed and signed, and you shall submit these records to the inventory supervisor for permanent filing.

17. At the termination of the inventory you shall submit a report to the inventory supervisor showing the number of tags lost or unaccounted for and the names of those responsible.

Instructions for Clearing House Checkers.—The following instructions should be issued to all clearing house checkers:

1. You have been appointed as a checker for inventory purposes and are assigned to the clearing house.

2. Your principal duty is that of checking inventory tags as to their accuracy, correctness, and completeness of information.

3. In order that your checking may be properly done you shall be familiar not only with your own instructions but also with the instructions applicable to other divisions—especially that of the tag writers.

4. As the accuracy of the inventory depends largely upon you, it shall be your duty to familiarize yourself with all data to be used in testing the completeness and correctness of the tags. This statement refers to the various bills of material, specifications, blue prints, operation sheets, spare-part catalogues, units of measurement and count,

and other data which you will find in the clearing house at the start of the inventory.

5. You shall not check the entire information as shown on the inventory tags but instead you will be assigned to check certain specific information only. In this way more accurate results will be effected and time will be saved by progressive tag inspection. You shall be supplied with Correction Slips and a rubber identification stamp upon which you will find a number identifying your position in the inventory organization.

6. Any inventory tags which you check and which you find to be incomplete or inaccurate shall not be approved by you, but shall be laid aside to be corrected by the tag corrector. In order to notify him of errors that have been committed you shall use the Correction Slips. You shall indicate thereon such error or lack of information which you discover, and attach this slip to the tag.

7. When tags are returned to you after correction you shall satisfy yourself that the tag is complete before placing your approval stamp on it.

8. The following brief rules indicate the method to be used by you for checking:

a. Location.—Compare the location shown on the tag with the tag writer's location as shown on the inventory assignment list. Satisfy yourself that the full location is given, *i.e.*, the building, the floor, and bay, and the bin number.

b. Name of Material or Part.—Consult your bill of material and locate the part number whose name is given in this section. Compare the name of the part or the material in the bill of material with the name as found on the inventory tag.

c. Material or Part Number.—Locate the part or material number as shown on the tag in your bill of material or card index of parts. Compare the name of the part found in the bill of material with the name as described on the tag.

d. Kind of Material.—Determine whether or not the material is direct by means of the part number, if shown. If bar stock, structural shapes, sheets, or other raw materials are reported on the inventory tag, determine whether direct or indirect by noting the location and then consulting your bill of material. Any material or supplies found on the indirect material list shall be checked as indirect.

e. Status of Material.—"Status of Material" refers to the condition in which the material is inventoried, *i.e.*, rough, parts-in-process, finished parts, assemblies-in-process, etc. If you refer to the instructions for inspectors you will note that they are responsible for determining the status of materials. For this reason you shall examine the tag for the inspector's stamp.

f. Size.—In this connection note if the size appears in the description of materials found in raw or rough condition. It is not necessary to report the size of parts and assemblies because the number and name are sufficient. Bar stock, structural shapes, consumable tools, and certain factory supplies, however, cannot be priced unless the size is reported on the tag.

g. Description.—In the case of component parts or assemblies, check *description* with information found in your bills of material or spare parts lists. If the description is reasonably complete and accurate do not return the tag for correction but put in the additional information if necessary. In checking tags upon which indirect materials have been reported it is necessary that the description be in accordance with the requirements shown on the indirect material list. The pricing division usually has a great deal of trouble pricing indirect material. Therefore, it is important that you insist that the description be complete.

h. Model.—In order to check the model to which the parts or assemblies apply you shall consult your bills of material or your card index of parts and assemblies. Bar stock, structural shapes, sheets, etc. as raw material may apply in some cases to specific models. In such cases the model to which the material belongs shall be shown. In many cases however, raw material is common to several models with the result that the tag writer will be compelled to write the word "uncertain" in this section of the tag. When tags appear with the word "uncertain" do not return them for correction, but you yourself determine the proper model or models to which this raw material applies. If material is common to several models you shall write the word "common" in place of the word "uncertain." In the final tabulation of the inventory this material shall be classified under Material Common to Several Models.

i. Operations Which Have Been Completed.—On inventory tags recording work-in-process you shall see that the inspector has certified to the operations which have been completed on the part reported.

j. Last Operation—Name or Number.—On work-in-process tags you shall also note if the inspector has certified to the name and number of the last operation performed on the part. It may be well from time to time to check this section with your operation sheets.

k. Machine at Which Located.—In order that the planning and production departments may be assisted in checking their records, work-in-process tags for parts in process shall show the symbol of the machine at which the material is located. If each department has an identifying letter for its machines it will afford you a means of spot-checking the accuracy of this section by the comparison of the Location section with this section.

l. Lot or Job Number.—All material in process shall be identified by its job number or lot number. In this matter you shall examine

to see that the inventory tag contains this information. It is necessary for the planning and production departments to have this data on their tabulation of the inventory.

m. Quantity.—Make sure that the quantity is recorded. If the writing is not clear or if the quantity reported appears to be excessive, do not approve the tag. Return the tag with a Correction Slip to the tag corrector.

n. Unit of Measure.—The unit of measure in the majority of cases of direct material will be *pieces.* In the case of raw materials however, the units vary. Some materials will be measured in pounds, others in square feet, others in lineal feet, etc. In order to check the correctness of the units so reported, it will be necessary that a List of Direct Materials be prepared in advance of the inventory. This list should be alphabetically arranged and show all the various kinds of raw material, their sizes, the models to which they apply, and the units by which they must be measured. It will be necessary in some cases for the tag writers to report the quantity of material in different units than the ones in which they are purchased. This applies especially to structural shapes and bar stock where it may be necessary for the tag writer to report "lineal feet" as a unit of measure. As this material is purchased in pounds and in order that it may readily be priced, these units shall be converted into pounds by a person stationed in the clearing house to be known as "Converter of Units of Measure."

In checking indirect material tags it will be necessary to exercise great care in the matter of units of measure. There will be so many different kinds of supplies reported in so many different units that errors are more likely to occur in reporting indirect material than in reporting direct material. To check the indirect material units properly you will be supplied with a list of indirect material.

Instruction for Tag Correctors.

1. On the day and hour the inventory commences you shall be at your station as designated on the assignment list. It shall be your duty as a tag corrector to complete or correct inventory tags which have been determined by the checkers in the clearing house as incomplete or inaccurate.

2. You shall be under the supervision of the chief tag corrector stationed in the clearing house.

3. From time to time, during the inventory you will receive from the clearing house by messenger, inventory tags which have been rejected by the checkers. Attached to each inventory tag you receive for correction, you will find a correction slip.

4. On the correction slip you will note the error or omission that has been made by the tag writer who originally wrote the inventory tag.

You will note the tag number and will then locate, by means of this number, the material to which the tag stub is attached.

5. You shall then correct or complete the tag in accordance with the actual facts of the case, and if necessary you shall call upon an inspector to assist you.

6. After the correction has been made you shall sign the correction slip and return both the tag and the slip to the chief tag corrector in the clearing house.

7. All correcting of tags shall be finished before the plant commences manufacturing operations.

Instructions for Coders.

1. You have been assigned to the coding division of the inventory organization and will be assigned by your division chief to code certain data so that it may be more quickly classified for pricing and tabulating.

2. You shall be familiar with the various code schedules, and shall know what information is to be coded.

3. Upon receiving inventory tags from the clearing house you shall determine which tags require coding. Whether you are to code location, material, size, status, or any other data depends upon your assignment by the division chief.

4. The code numbers you are to use shall be obtained from the code schedules, and you shall take no arbitrary action in case you find that the code schedules are not complete. Instead, you shall take special matters to your division chief for his decision.

5. If you are assigned to *check* coding performed by other employees, you shall satisfy yourself that the code numbers used agree exactly with the code schedules.

6. You shall so expedite your work that inventory tags may reach the tabulating division without delay.

7. *You shall make no changes or erasures on the inventory tags.*

INSTRUCTIONS PERTAINING TO INVENTORY FORMS

Inventory Forms.—Lack of forms, or the poor design of those that are used, contribute in large measure to an unsuccessful inventory. In this respect it should be the duty of the inventory supervisor to prepare such records as will at all times maintain control not only over the material but also over the operations of the inventory personnel. Printer's proofs of all forms should be submitted by the inventory supervisor to the advisory committee for approval. Where forms are reviewed by this committee many important features are often incorporated which make reports which are prepared at the completion of the inventory more valuable and effective.

In the paragraphs which follow will be found first, a list of necessary inventory forms classified under each division, and second, a detailed description of each form.

The special inventory forms to be described are:

Inventory Supervisor.
- Notification for Transfer of Personnel.
- Inventory Time Report.

Clearing House Division.
- Inventory Tag Delivery Slip.
- Inventory Tag Receipt Slip.
- Tag Writer's Final Clearance.
- Record of Inventory Tags Issued.
- Record of Inventory Tags Returned.
- Correction Slip.
- Correction Envelope.
- Notice of Errors or Omissions.

Tag Writing Division.
- Inventory Tag—Direct Material (Other than Work-in-process).
- Inventory Tag—Direct Material (Work-in-process).
- Inventory Tag—Indirect Material.
- Inspector's Tag.
- Chief Tag Writer's Inventory Tag Sheet.
- Shipment Inventory Tag.

Inspection Division.
- Material Not to Be Inventoried Tag.
- Envelope for Assembly Sheets.

Tabulating Division.
- Preliminary Tabulation Sheet.
- Final Inventory Sheet—Other than Work-in-process.
- Final Inventory Sheet—Work-in-process.
- Final Inventory Sheet—Indirect Material.

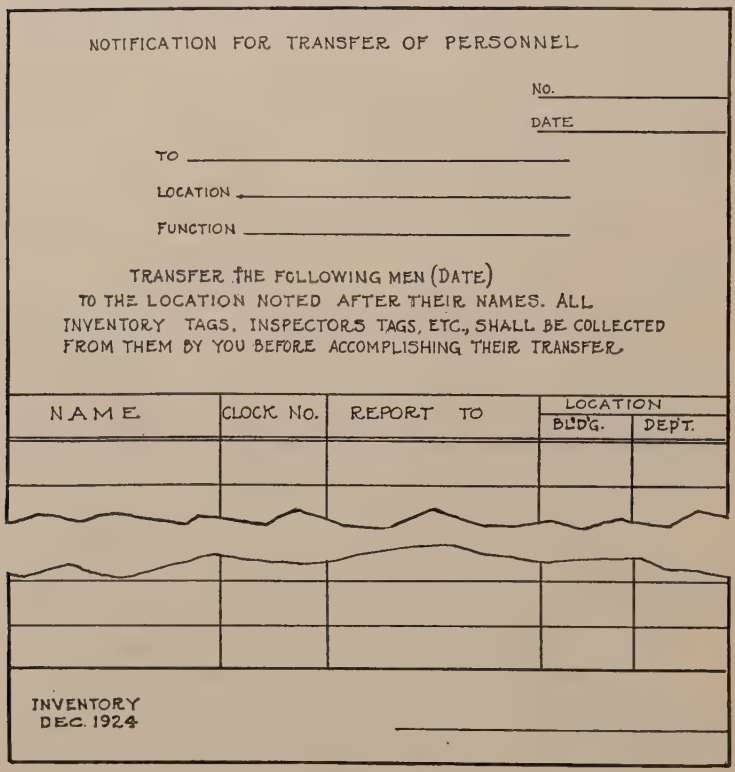
Miscellaneous.
- Notice of Correction.

INVENTORY SUPERVISOR

Notification for Transfer of Personnel.—In order that the inventory supervisor may know at all times the number of employees working on the inventory in the various departments, transfer of men from one department to another should not be made unless proper authority is given. This form is used by the inventory supervisor to instruct the various division heads to

transfer those men, whose names appear on this form, from one location in the plant to another. This form is usually printed in triplicate, the three copies being distributed as follows:

1. The first copy to the chief of some section notifying him to transfer personnel.
2. The second copy to the clearing house to keep it informed of the location of all employees.
3. The third copy for the inventory supervisor.


NOTIFICATION FOR TRANSFER OF PERSONNEL

NO. _____

DATE _____

TO _____

LOCATION _____

FUNCTION _____

TRANSFER THE FOLLOWING MEN (DATE) TO THE LOCATION NOTED AFTER THEIR NAMES. ALL INVENTORY TAGS, INSPECTORS TAGS, ETC., SHALL BE COLLECTED FROM THEM BY YOU BEFORE ACCOMPLISHING THEIR TRANSFER.

NAME	CLOCK NO.	REPORT TO	LOCATION	
			BLDG.	DEPT.

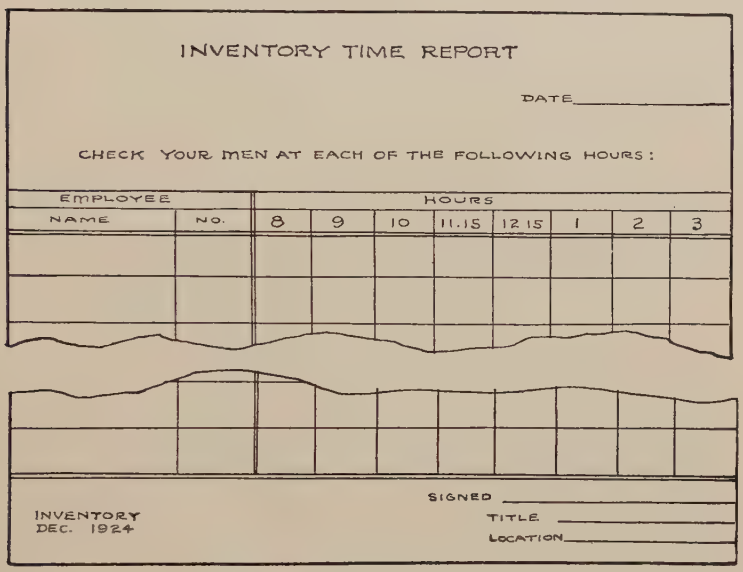
INVENTORY DEC. 1924 _____

FIG. 5.—Notification for transfer of personnel.

Inventory Time Report.—Because the inventory period is short and the inventory organization temporary, there is always a certain number of employees who consider this time in the nature of a vacation. Other employees at times have been so bold as to "ring-in" on their time cards in the morning, leave for the day, and later return to "ring-out" in the evening. In order to prevent any occurrence of this nature the inventory

supervisor should furnish each division head with a supply of Inventory Time Reports which should be used in checking employees at various times of the day.

Instructions are issued by the supervisor that this time report is to be furnished to him daily. After the supervisor has inspected these reports, he forwards them to the payroll department for check against the employees' time cards. Whenever that department discovers irregularities, it takes such action as is deemed necessary.


INVENTORY TIME REPORT

DATE_____

CHECK YOUR MEN AT EACH OF THE FOLLOWING HOURS:

EMPLOYEE		HOURS							
NAME	NO.	8	9	10	11.15	12.15	1	2	3

SIGNED _____

TITLE _____

LOCATION _____

INVENTORY
DEC. 1924

Fig. 6.—Inventory time report.

CLEARING HOUSE DIVISION

Inventory Tag Delivery Slip.—This form is used by the custodian in the clearing house at the time inventory tags are delivered to department chief tag writers. The latter must sign these slips before receiving any tags. This form is printed in duplicate, the original being held by the clearing house as a means of checking all inventory tags delivered, while the duplicate is given to the department chief tag writer who receives the tags. The original is used by the custodian in posting to his Record of Inventory Tags Issued and to the heading of the Record of Inventory Tags Returned form.

INVENTORY TAG DELIVERY SLIP

ISSUE NO _____

CUSTODIAN:

DATE _____

I ACKNOWLEDGE RECEIVING THE FOLLOWING INVENTORY TAGS

FORM NO.	FROM	TO	QUANTITY
#11			
#12			
#13			

I WILL RETURN ALL TAGS WHETHER USED, UNUSED, SPOILED OR VOIDED AND IN THE SAME NUMERICAL ORDER AS WHEN RECEIVED SHOULD ANY TAG BE LOST I WILL NOTIFY YOU AT ONCE

_____
CHIEF TAG WRITER

_____
LOCATION ASSIGNMENT

ONLY ONE FORM OF INVENTORY TAG CAN BE ISSUED ON THIS SLIP

FIG. 7.—Inventory tag delivery slip.

INVENTORY TAG RECEIPT SLIP

No. _____

NAME _____ DATE _____

I ACKNOWLEDGE RECEIPT OF THE FOLLOWING TAGS

FORM	FROM	TO	QUANTITY	ISSUE NO.	TAG NUMBER UNUSED	TAG NUMBER VOID

THIS RECEIPT IS NOT FINAL CLEARANCE BUT ONLY ACKNOWLEDGES RECEIPT OF ABOVE TAGS FOR CHECKING

_____
CUSTODIAN.

FIG. 8.—Inventory tag receipt slip.

Inventory Tag Receipt Slip.—This form, printed in duplicate, is used by the custodian as a receipt to the department chief tag writers upon the return of inventory tags to the clearing house. As stated on the form itself, this receipt is not a final clearance for the entire block of inventory tags originally issued but is only a receipt for that portion of the block which is returned. The custodian signs this form, giving the original to the department chief tag writer who returns the tags, retaining the duplicate for his own records. The duplicate is then used by the custodian for posting to his Record of Inventory Tags Returned.

Tag Writer's Final Clearance.—When a department chief tag writer has returned *all* inventory tags of a *block* originally

CHIEF TAG WRITERS FINAL CLEARANCE

No.

NAME _____ DATE _____

FORM NO.	FROM	TO	QUANTITY

YOU ARE HEREBY NOTIFIED THAT CLEARANCE HAS BEEN GIVEN ON THE ABOVE INVENTORY TAGS

ISSUE NO. _____

_____
CUSTODIAN

FIG. 9.—Chief tag writer's final clearance.

issued to him, he must be given final clearance for that block. The notification of clearance is given on this form by the custodian who delivers the original to the department chief tag writer retaining the duplicate for his own records. The copy retained by the custodian is then used by him in checking and closing the Record of Inventory Tags Returned.

Record of Inventory Tags Issued.—This form, without copies, is used by the custodian to record the individual issues of all inventory tags. As stated elsewhere each issue should be given a serial number and at the same time should contain a

standard number of inventory tags. The source for posting to this form is the Inventory Tag Delivery Slip. Each individual issue is recorded on this form in the order of its serial number.

RECORD OF INVENTORY TAGS ISSUED

SHEET No.

ISSUE No.	DATE	ISSUED TO	LOCATION	TAGS ISSUED			DATE TAGS RETURNED	NOTES
				FROM	TO	QUANTITY		

INVENTORY DEC 1924

CUSTODIAN

FIG. 10.—Record of inventory tags issued.

Upon the completion of the inventory this form gives a complete history of all inventory tags issued, the quantity, the serial numbers of the tags, and to whom issued.

RECORD OF INVENTORY TAGS RETURNED TO CLEARING HOUSE

ISSUE No

ISSUED TO

LOCATION

FINAL CLEARANCE No

TAGS ISSUED

DATE ISSUE CLOSED

FROM	TO	QUANTITY

RECEIPT No	DATE OF RETURN	TAGS RETURNED			TAGS USED			TAGS UNUSED			TAGS VOID	INVENTORY TAG SEQUENCE	
		FROM	TO	QUANTITY	FROM	TO	QUANTITY	FROM	TO	QUANTITY		FROM	TO

INVENTORY DEC. 1924

CUSTODIAN

FIG. 11.—Record of inventory tags returned to clearing house.

Record of Inventory Tags Returned.—This form, without copies, is used by the custodian to record the return of inventory tags by each department chief tag writer. A separate sheet of

this form is used to record the return of inventory tags which were originally issued *under the same serial number.*

1 No._____

THIS INVENTORY TAG RETURNED FOR CORRECTION
TO INVENTORY TAG CORRECTOR.

NAME _____

BLDG No. _____

INVENTORY TAG No._____ HAS BEEN EXAMINED AND FOUND INACCURATE OR INCOMPLETE. ITEMS MARKED X SHOULD BE CORRECTED.

NO.	ERROR COMMITTED	X
1	MODEL OMITTED	
2	LOCATION OMITTED	
3	QUANTITY OMITTED	
4	UNIT OMITTED	
5	KIND OF MATERIAL OMITTED	
6	SIZE OMITTED	
7	DESCRIPTION OMITTED	
8	PART No. OMITTED	
9	TAG WRITER'S No. OMITTED.	
10	STATUS OMITTED	
11	OPERATION OMITTED	
12	LOT No. OMITTED	
13		
14	WRONG UNIT OF MEASURE	
15	" MODEL	
16	" PART No.	
17	" LOCATION	
18	" STATUS	
19	" SIZE	
20	" DESCRIPTION	
21	" INVENTORY TAG	
22	INCOMPLETE DESCRIPTION	

AFTER CORRECTION RETURN THIS FORM WITH INVENTORY TAG TO THE

INVENTORY CLEARING HOUSE

IN SAME ENVELOPE THAT THIS TAG IS CONTAINED IN.

INVENTORY CLEARING HOUSE

BY_____

FIG. 12.—Correction slip.

Before department chief tag writers are given final clearance for each issue of tags by means of the Tag Writer's Final Clear-

ance, the custodian must satisfy himself from the Record of Inventory Tags Returned that all tags of the issue have been accounted for.

Correction Slip.—This form is used by the checkers in the clearing house to notify tag correctors of such errors or omissions which appear on the completed inventory tags. A more complete description of its use will be found in the chapter on the Clearing House. It will be noted that this form is perforated: the original copy is sent with the incorrect inventory tag to tag correctors located in the various departments; the duplicate is retained by the chief tag corrector in the clearing house until the incorrect inventory tag has been returned. At the completion of the inventory all correction slips may be sorted and arranged for a report showing classification of errors discovered during the inventory and the number of each kind. This report can be used for guidance in future inventories.

Correction Envelope.—This envelope is used by the chief tag corrector to forward incorrect inventory tags with correction

TO INVENTORY TAG CORRECTOR No. _____

NAME _____

BUILDING NAME _____ No. _____

THIS ENVELOPE CONTAINS INVENTORY TAGS RETURNED FOR CORRECTION. HANDLE THESE TAGS WITH GREATEST CARE POSSIBLE. AFTER CORRECTION RETURN INVENTORY TAGS IN THIS SAME ENVELOPE.

INCORRECT INVENTORY TAG ENVELOPE

RETURN TO CLEARING HOUSE

CLEARING HOUSE CHECKERS NUMBER

Fig. 13.—Correction envelope.

slips to tag correctors in the various departments. It should also be used for the return of the corrected tags to the clearing house.

Notice of Errors or Omissions.—This form is used by the chief of the clearing house especially during the morning of the first day of the inventory to notify tag writers of the common errors of omissions which they are making in filling out inventory tags. According to the instructions of the clearing house, the chief of that division must make it his duty on the morning of the first

inventory day to glance over all inventory tags prior to their distribution to the checkers. When it is evident to him that a tag writer is violating instructions he must notify that tag writer

NOTICE OF ERRORS OR OMISSIONS

NO. _____

TO _____ DATE _____

BLD'G. _____

DEPT. _____

THIS MAN _____

UNDER YOUR SUPERVISION IS MAKING THE FOLLOWING ERRORS

NO	ERRORS	
1	WRITING INDISTINCT	
2	MODEL OMITTED	
3	LOCATION OMITTED	
4	UNIT OMITTED	
5	QUANITY OMITTED	
6	KIND OF MATERIAL OMITTED	
7	DISCRIPTION OMITTED	
8	SIZE OMITTED	
9	PART NO. OMITTED	
10	TAG WRITER'S NO. OMITTED	
11	STATUS OMITTED	
12	OPERATION OMITTED	
13	LOT NO. OMITTED	
14	WRONG UNIT OF MEASURE	
15	" MODEL	
16	" PART NO.	
17	" LOCATION	
18	" STATUS	
19	" SIZE	
20	INCOMPLETE DISCRIPTION	

OTHER COMMENTS

NOTIFY THIS MAN AT ONCE, CHECK THIS MAN'S TAGS MORE CAREFULLY BEFORE RETURNING THEM TO CLEARING HOUSE.

INVENTORY CLEARING HOUSE.

FIG. 14.—Notice of errors or omissions.

through his chief by means of this form. After the department chief tag writer has notified his tag writer of his errors he must sign the reverse side of this form and return it to the clearing house.

TAG-WRITING DIVISION

Inventory Tag—Direct Material (Other than Work-in-process). This form is used by tag writers to record data with respect to the following direct material:

1. Bar stock, sheet metal, wire, structural shapes, pig metal, and all other raw materials.
2. Rough castings, forgings, and stampings.
3. Finished parts purchased and manufactured.
4. Finished assemblies purchased and manufactured.
5. Finished products purchased and manufactured.
6. Salvage material.

Work-in-process should *not* be recorded on this tag.

Tag writers fill in the information called for on this tag, detach that part to be returned to the clearing house, and satisfy themselves that the stub has been securely wired to the material inventoried.

Inventory Tag—Direct Material (Work-in-process).—This form is used by the tag writers to record data with respect to the following direct material:

1. Component parts in process.
2. Assemblies in process.
3. Product in process of assembly.

Work-in-process only should be recorded on this tag.

Tag writers fill in the information called for on this tag, detach that part to be returned to the clearing house and satisfy themselves that the stub has been securely wired to the material inventoried.

Inventory Tag—Indirect Material.—This form is used by the tag writers to record data with respect to all indirect material, *i.e.:*

1. Operating supplies.
2. Maintenance and repair supplies and parts.
3. Consumable tools unused.
4. Scrap.
5. Packing and shipping material and supplies.

Direct material should not be reported on this form. Tag writers assigned to locations or stores in which indirect materials are located should be furnished with detailed lists of indirect materials.

Inspector's Tag.—This tag is used by tag writers and attached by them to any assemblies which are found in process of manufacture. It is used to notify inspectors that assembly sheets corresponding to the assemblies-in-process are to be filled out and attached to the material by the inspector. A more detailed explanation of the use of this tag is found in the Instructions for Tag Writers.

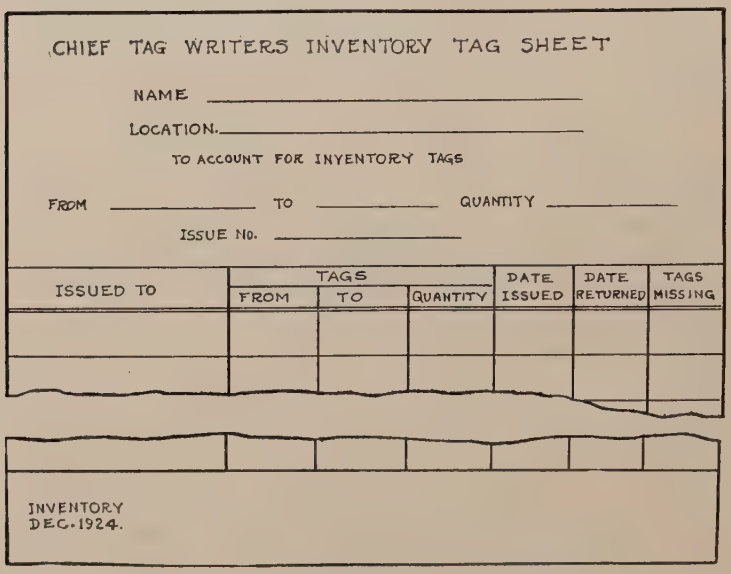
INVENTORY - DEC. 1924
INSPECTOR
TO THIS ASSEMBLY ATTACH ASSEMBLY SHEET, INDICATING THEREON PARTS IN ASSEMBLY AT THE PRESENT STAGE OF COMPLETION. ESTIMATE THE HOURS OF ASSEMBLY LABOR EXPENDED UP TO DATE OF INVENTORY ONLY
DO NOT REMOVE THIS TAG FROM THIS MATERIAL
WHEN INVENTORY TAG IS WRITTEN TAG WRITER WILL DETACH THIS TAG AND REPLACE WITH INVENTORY TAG

FIG. 15.—Inspector's tag.

Chief Tag Writer's Inventory Tag Sheet.—This form is used by department chief tag writers to record issues of inventory tags to their individual tag writers. Because department chief tag writers are charged with all inventory tags received by them, it is necessary that they in turn know at all times to whom they have distributed the tags and in what quantities. This form permits them to hold their individual tag writers accountable for the return of all tags.

Shipment Inventory Tag.—This tag is used to record such materials as are shipped during the period of the inventory. The upper half of this tag remains in the bin from which the parts to be shipped have been withdrawn. The lower half of the

tag accompanies the material withdrawn and remains attached until shipment has been made. After shipment this half of the tag is destroyed. The quantity of the material withdrawn during the inventory as recorded on the upper half of the tag is added to the actual count of the remaining material in the bin or stack, and an inventory tag is then written for the sum of these two quantities, *i.e.*, the actual count plus the amount withdrawn.


CHIEF TAG WRITERS INVENTORY TAG SHEET

NAME _____

LOCATION. _____

TO ACCOUNT FOR INVENTORY TAGS

FROM _____ TO _____ QUANTITY _____

ISSUE No. _____

ISSUED TO	TAGS			DATE ISSUED	DATE RETURNED	TAGS MISSING
	FROM	TO	QUANTITY			

INVENTORY
DEC. 1924.

FIG. 16.—Chief tag writer's inventory tag sheet.

INSPECTION DIVISION

Material Not to Be Inventoried Tag.—Material not to be included in the inventory should be identified by this tag. This material should be tagged prior to the start of the inventory. Wherever tag writers encounter material to which this tag has been attached, they attach no inventory tag. According to the instructions pertaining to the inspectors, they are to proceed through the factory prior to the inventory and attach these tags to material not to be inventoried. Every tag must bear the inspectors' identification stamp, and in addition must specify why the material is not to be inventoried.

Envelope for Assembly Sheets.—This envelope is used by inspectors when supplying data with respect to assemblies-in-

process. Inspectors must enclose assembly sheets in these envelopes in order that these sheets may be protected in the assembly departments, and also that they may be readily identified upon receipt in the clearing house and pricing section. The assembly sheets must show the names, numbers, and quantity of parts found in the assembly-in-process, and also the number of assembly hours.

TABULATING DIVISION

Preliminary Tabulation Sheet.—When it is necessary that preliminary tabulations be supplied to the planning and production departments as a means for checking their respective records, this form should be used by the tabulating division. It will be noted that no pricing is required on this form.

Final Inventory Sheet—Other than Work-in-process.—On this form is typed or printed the final and completed inventory of all direct material classified as Other than Work-in-process.

Material to be recorded on this form should be:

1. Bar stock, sheet metal, wire, structural shapes, pig metal, and all other raw material.
2. Rough castings, forgings, and stampings.
3. Finished parts purchased and manufactured.
4. Finished assemblies purchased and manufactured.
5. Finished products purchased and manufactured.
6. Salvage material.

Final Inventory Sheet—Work-in-process.—On this form is typed or printed the final and completed inventory of all material classified as Work-in-process.

Material to be recorded on this form should be:

1. Component parts in process.
2. Assemblies in process.
3. Products in process of assembly.

Final Inventory Sheet—Indirect Material.—On this form is typed or printed the final and completed inventory of all material classified as Indirect Material.

Material to be recorded on this form should be:

1. Operating supplies.
2. Maintenance and repair supplies and parts.
3. Consumable tools unused.
4. Scrap.
5. Packing and shipping material and supplies.

Notice of Corrections.—In spite of the greatest care taken, a certain number of inventory tags, although examined and found

NOTICE OF CORRECTION

TO INVENTORY SUPERVISOR
KINDLY MAKE CHANGES IN ACCORDANCE WITH THE FOLLOWING CORRECT DATA

	PRESENT DATA	CORRECT DATA
TAG NUMBER		
PART NUMBER		
QUANTITY		
MODEL		

SHALL ENTIRE TAG BE CANCELLED?

YES	NO

REASON FOR CORRECTION

DATE	SIGNED

TAG CORRECTED OR CANCELLED AS ABOVE

TABULATING DIVISION

DATE	SIGNED

INVENTORY SUPERVISORS APPROVAL

FIG. 17.—Notice of correction.

apparently correct by the checkers, are later found to be incorrect or incomplete either by inspectors or foremen after they have

compared tag stubs with the material. Cases of this kind do not occur often but in order that the tags may be corrected before they are tabulated some notice must be sent to the tabulating division. As this division has explicit instructions to make no changes on inventory tags without written authority, this form combines the features of a notification of error and authority for changing the tags. It will be noticed upon inspection of this form that this record is to be delivered first to the inventory supervisor who must approve it before the tabulating division is authorized to make a change on any tag.

INSTRUCTIONS FOR PREPARING THE PLANT FOR INVENTORY

Receiving Department.—The following instructions should be issued by the inventory supervisor through the factory manager to the receiving department at least one week before the day set for the inventory:

1. The receiving department must be cleaned up and made ready for the inventory.
2. All materials received up to the day that the inventory commences, must be checked, inspected, and moved into their respective stores.
3. No material must be found in the receiving department on the morning of the day that the inventory commences.
4. All materials and supplies received during the inventory must be segregated and bonded until the inventory is completed. No such material shall leave the receiving department until notification has been received from the inventory supervisor that the inventory is completed. At that time this material may be inspected and transferred to their proper stores.

Manufacturing and Maintenance Departments.—The following instructions should be issued by the inventory supervisor through the factory manager to the various foremen at least one week before the day set for the inventory:

1. All departments must be cleaned up and made ready for the inventory.
2. Scrap and spoiled material which cannot be salvaged must be removed from all departments and placed in the scrap piles.
3. Material which can be salvaged must be removed from all departments and inspection cribs and sent to the salvage department for segregation.

4. All parts in process of manufacture shall be finished if possible before the inventory commences, transferred to the inspection cribs for inspection, and removed to the finished parts stores where they shall be inventoried with other parts of the same symbol number or name.

5. Assemblies, whether major, sub, sub-sub, or unit, shall be finished if possible, and not left in semi-finished condition for the inventory.

6. All material and supplies must be neatly piled or arranged for counting, weighing, or measuring, and in such a way as will permit of a quick and accurate count.

7. If parts of the same symbol number are found in different stages of completion in the same department they shall be segregated by separate piling and arrangement.

8. Material that is obsolete must be segregated and identified by the inspectors prior to the inventory.

9. If possible all machines shall be cleared of finished parts. Such parts or material must be placed in its proper pile or stack in the department. For material in automatic screw machines and other automatics refer to Material in Automatics.

10. Bar stock and like materials found in the operating departments, not applicable to any specific lot or job, must be returned to their proper stores.

11. Signs of sufficient size, denoting thereon the department name and letter (or number) shall be placed in conspicuous places. These signs will assist members of the inventory organization to locate their assignment positions and to record correctly the location of the material on the inventory tag.

12. All parts of the same symbol number or name, applicable to a specific lot or job, must be piled or arranged together.

13. Jigs, dies, fixtures, and all other production equipment, if not in machines, must be returned to the tool or equipment cribs.

14. Material on consignment, whether for resale or upon which work is to be performed, shall be segregated and identified as such.

15. All parts, assemblies, or finished products returned for repairs, title to which does not rest with the company, must be segregated and identified as such.

16. All pans, tote boxes, and other containers used for weighing materials must have their net weight painted or marked thereon.

17. All mechanical equipment such as platform scales, bench scales, computing scales and wire or rope measuring machines, to be used during the inventory, must be thoroughly tested for accuracy before the inventory.

18. All mechanical equipment to be used in the inventory must be placed at those points in the plant deemed most advantageous by the inventory supervisor.

19. All material not to be taken into the inventory shall be identified by a tag marked "Not to Be Inventoried."

20. Material rejected upon inspection, or found defective during processing which is awaiting return to the vendor for credit, must be segregated and tagged. The tag must show full description of the material, the quantity, and the name of the vendor.

21. Finished parts or assemblies on assembly floors in excess of requirements must be returned to stores and credits issued.

22. Factory, operating, and maintenance materials and supplies in the various operating and maintenance departments, in excess of requirements, must be returned to their respective stores and credits issued.

23. Each lot or job in process of manufacture shall have an identifying tag attached thereto.

24. The net weight of all spools, spindles, etc. for wire or rope, must be painted thereon.

25. All machines shall have their identifying numbers or symbols freshly painted thereon so as to allow parts-in-process to be described on the inventory tag as having reached a specific machine along the line. This will assist the planning and production departments in checking the accuracy of their work-in-process records.

26. Inspection cribs must be free of all material on the day the inventory commences. Inspection prior to the inventory shall proceed in such a way that all components shall have been inspected and transferred to stores or otherwise disposed of before the start of the inventory.

27. Scrap removed from the various departments must be segregated and piled in the scrap department according to the various kind of scrap, *i.e.*, iron, brass, copper, leather, paper, etc.

28. Parts, materials, or supplies to be salvaged must be segregated in the salvage department according to the individual part numbers, kind of material, and kind of supplies respectively, and properly identified.

29. Machines shall not be cleared of such tools or production equipment as is in place at the commencement of the inventory.

Stores Department.—Since well arranged and properly stored materials in storerooms will facilitate greatly the work of inventory the following instructions should be issued by the inventory supervisor through the factory manager to all foremen in the various storerooms at least one week before the day set for the inventory:

1. All stores, whether for raw materials, finished parts and assemblies, finished products, or operating and maintenance supplies, shall be cleaned up and made ready for the inventory.

2. All bin tags shall be in their respective places. This will allow of proper recording on the inventory tag of location, name of part or material, and part number.

3. All components or materials out of bins must be replaced in their respective bins.

4. Components or material on assembly floors, found to be in excess of requirements and returned for credit, shall be placed in their proper bins or storage spaces upon receipt.

5. Operating and maintenance materials and supplies in the various operating and maintenance departments, found to be in excess of requirements and returned for credit, shall be placed in their proper bins or storage spaces upon receipt.

6. All components and materials shall be neatly piled or arranged for counting, weighing, or measuring.

7. All parts of the same symbol number must be grouped together. This will prevent similar parts or material from being inventoried at several places in the storeroom.

8. All raw material, such as bar stock, structural shapes, tubing, etc. shall be arranged in racks according to sizes. Material such as bar steel will be identified for inventory and production purposes by having the ends of each bar painted a designating color.

9. Mechanical equipment such as platform and computing scales to be used in the inventory must be tested for accuracy and placed at advantageous points in the storeroom.

10. Component parts, identical as to shape and size and different only by the kind of material from which they have been made, must be segregated from each other.

11. All materials, parts, and supplies delivered into stores by the receiving department on the day before the inventory commences shall be removed from the trucks and placed in their respective bins or storage spaces for quick and accurate count.

12. All parts received in the finished parts stores from the inspection department on the day prior to the inventory shall be placed at once in their respective bins or storage spaces.

13. In order that requisitions for finished parts to be delivered to the assembly floors may be quickly and accurately filled, many concerns make it a practice of putting a specified number of parts in bags. The number of parts so "bagged" may be in multiples of a selected number, or in lot quantity. Where parts are bagged the foremen of the storerooms shall indicate on the outside of such bags the quantity of parts therein. This must be done before the inventory commences.

14. All barrels, boxes, containers, wheelbarrows, and other receptacles used in the process of inventorying material in bulk should have their tare weights plainly painted thereon, or the number of parts they will hold when filled.

Packing and Shipping Department.—The following instructions should be issued to the packing and shipping department by the inventory supervisor:

1. The packing and shipping departments must be cleaned up and made ready for the inventory. All scrap must be removed from the department.
2. Usable material not applicable to any order shall be returned to stores. Material concerning which there is uncertainty as to its possible use shall be examined by inspectors.
3. All orders for shipment received up to and including the day prior to the inventory shall be filled and shipped before the inventory commences. In this connection packers must work overtime on the day preceding the inventory if necessary. Notices of shipment must be forwarded at once to the accounting department for billing. If shipment is not possible on the day prior to the inventory, permission to ship such material during the inventory must be obtained from the inventory supervisor.
4. When it is necessary that special shipments of material be made during the inventory, such material shall not be packed unless it is received in the packing and shipping department with a Shipment Inventory tag attached. When shipment is made this tag must be destroyed.
5. No packing or shipping of material shall be done during the inventory unless the shipping order has been stamped "Approved" and signed by the inventory supervisor.
6. Filled or partially filled orders located in the packing and shipping department, held up from shipment, must be disposed of in accordance with instructions from the inventory supervisor. In order that disposition may be made of all such orders, the packing and shipping department must prepare, two days prior to the inventory, a list of these orders giving all essential information concerning them.
7. All packing lumber, paper, and other supplies must be neatly arranged for counting or measuring.

Inventory Clearing House.—The division head in charge of the clearing house should receive the following instructions at least two weeks prior to the commencement of the inventory:

1. The clearing house shall be established in an office as centrally located as possible.
2. A sufficient number of tables, chairs, telephones, and other necessary equipment shall be placed in the clearing house to accommodate all who are to be stationed there during the inventory. It is most essential that there be a sufficient number of telephones as these afford the best

means to secure information rapidly and to communicate with departments concerning matters which require immediate attention. If the office where the clearing house is to be located lacks the number of telephones required, extra ones should be temporarily installed.

3. Tables shall be arranged for the progressive checking of tags.

4. A section for issuing inventory tags shall be arranged. This may best be accomplished by arranging, in line formation, paper-covered tables upon which a section for each department chief tag writer, indicated by his name, has been allotted.

5. At least one day prior to the inventory all tags, supplies, writing boards, pencils, rulers, and other necessary supplies, shall be placed in the clearing house.

6. At least one day prior to the inventory the tags needed for the first issue on the first day, and in addition all necessary supplies, must be apportioned for each department chief tag writer on the issuing tables by the custodian.

7. Appropriate signs shall be placed in the clearing house to designate the various sections.

8. In order that the inventory tags returned to the clearing house every evening may be properly protected, sufficient space should be provided in the vaults. The tags shall be deposited in these vaults every evening by the custodian.

9. All necessary data for checking the accuracy and completeness of the inventory tags shall be gathered together at least two days before the inventory and arranged in the clearing house.

The following is a list of the data required for checking direct material:

1. Blue prints.
2. Specifications.
3. Bills of material.
4. Operation sheets.
5. Assembly lists.
6. Spare parts lists.
7. Catalogues.

The following are necessary for checking indirect material:

1. Schedule of operating and maintenance supplies.
2. Schedule of consumable tools.
3. Supply catalogues.
4. Location assignment lists.
5. Location of supply stores.

CHAPTER IV

DESIGN AND ROUTING OF THE INVENTORY TAG

In designing the inventory tag the following features should be kept in mind:

1. Sufficient space for the information required.
2. The design should be such that a portion of the tag itself or a complete copy of the tag may be attached to the material, identifying it as counted.
3. The size of the tag is naturally dependent upon the amount of information to be written on it. However, the portion of the tag to be returned to the clearing house and finally priced should be of a standard filing size.
4. Distinguishing colors for the different kinds of inventory tags.

Inventory tags may be divided into two classes; namely,

a. Tags which are used for reporting quantity and description only, such information being transferred to inventory sheets and the sheets priced instead of each individual tag.

b. Tags which are used for reporting not only quantity and description but also designed to allow each individual tag to be priced and extended, and the complete information then transferred to the final inventory sheets.

When the same kind of material or parts are located in many different places it may be more advantageous to use (*a*), for then the quantity may be totaled and one pricing only need be accomplished. However, if the material is centralized and so grouped or stored as to bring all, or practically all, of the same kind of materials and parts together, it is advisable to use (*b*), for the latter is a complete record in itself.

Size of Tag.—If examination is made of a representative number of inventory tags it will be observed that sufficient space has not been allotted to record properly such information as is required. Many sections of the tag require space sufficient for a very complete description, therefore, if the tag is improperly designed, the full description of the material cannot be written on it. This brings about one of the following results:

either the tag is returned for more information or the pricing is incorrectly performed. In spite of the small cost of stationery for inventory purposes, inventory tags continue to be printed on forms which are too small. Before inventory tags are printed the inventory supervisor should satisfy himself that plenty of space for the necessary information has been allowed. This is a small but very vital matter to the checkers and the pricing division.

Design of Tag.—The carbon-copy tag adopted for many inventories may be used to advantage under certain conditions, but it is safe to say that in a large number of cases it does not perform its function properly. The advantage of the carbon-copy tag is that only one writing is necessary and that the second copy is an exact copy of the original. The original is torn off and forwarded for pricing, while the duplicate, printed on a heavier stock remains attached to the material. Although this advantage is evident and time is saved by its use, still there is no necessity for the part of the tag which remains attached to the material to show all the detailed information required on the original. It is sufficient if the tag to be attached to the material shows only the tag number, part number, and quantity. The tag itself indicates that the material has been inventoried. One disadvantage of this kind of tag is an indistinct and sometimes illegible carbon copy. To make the duplicate plain the tag writers must not allow their pencils to become blunt.

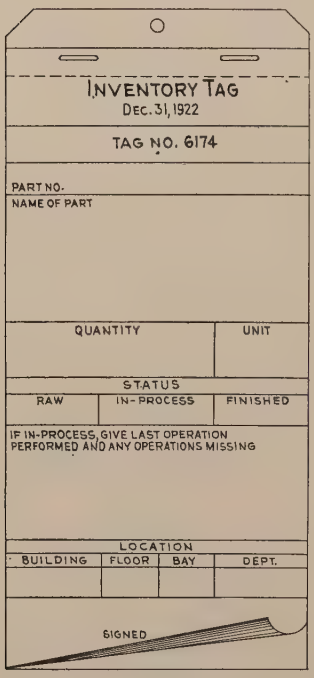


FIG. 18.—Inventory tag (with carbon back).

Another type of inventory tag is one that is designed with a stub. The use of this tag is very satisfactory and performs its function well. The tag writer fills out the lower portion of the tag which is finally received by the clearing house, fills in the small amount of information required on the stub, attaches

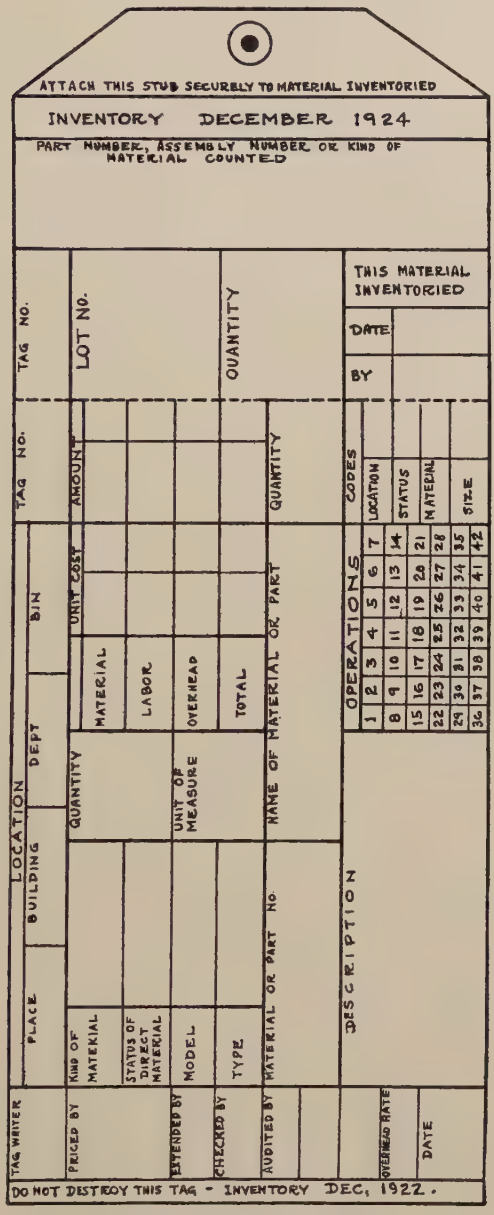


FIG. 19.—Inventory tag.

the stub to the material (and in so doing identifies the material as counted) and delivers the lower portion to his department chief tag writer.

A third type of tag is sometimes used when the high value of the material to be inventoried requires a second physical count, absolutely independent of the first count. This tag is made up of three parts, each part being divided from the others by perforations but all parts identified by the same serial number. The first, or lower, part of the tag is written on by the first inventory crew, detached by them (after the remainder of the tag has been attached to the material) and forwarded to the inventory clearing house. When the second inventory crew counts the same material they write their findings on the second part of the tag (which has been attached to the material by the first crew) detach it from the stub and forward it to the clearing house. The first and second parts are then compared in the clearing house.

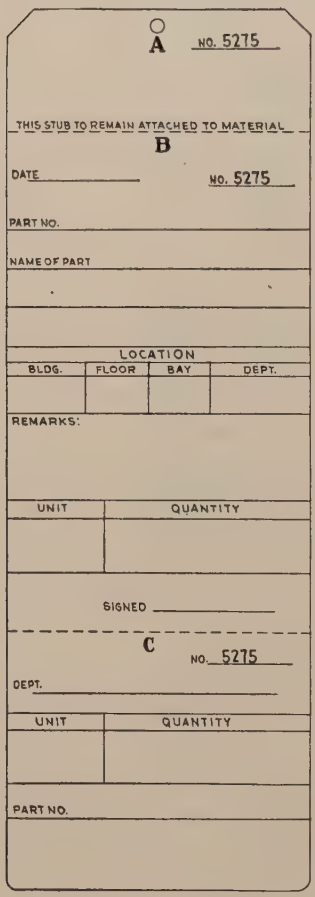


FIG. 20.—Inventory tag (for duplicate count).

Where the more modern punched card method is used for inventory purposes, two methods may be used:

1. Plain tabulating cards may be used in the tabulating section and punched from the regular inventory tag written in the plant.

2. An inventory tag form may be designed on the tabulating card itself and this used as the regular inventory tag. This is called a "dual card" and may be used to very great advantage for pricing, compiling, and tabulating inventories quickly. Larger inventories have been taken very successfully in this manner, although the tabulating cards have passed 30 or 40 handlings before they reached the punching, sorting, and tabulating machines. When these tabulating cards are written in the factory, a small identification tag bearing

the same serial number as the tabulating tag is attached to the material to signify that it has been counted.

Size for Filing Purposes.—Without sacrificing any necessary space the inventory tag should be designed for filing in standard-size cabinets. Many times this point is overlooked with the result that special equipment is required for permanent filing.

Color of Tag.—The average manufacturing concern usually requires three different inventory tag forms. These forms are used for recording the following material:

1. Direct Material—Other than Work-in-process.
2. Direct Material—Work-in-process.
3. Indirect Material.

Each of these tags should be of a different color to designate the material described thereon to the clearing house, pricing, and tabulating divisions. In many plants certain materials are consumed so slowly that inventory tag stubs of the previous inventory are attached to materials at the time of a subsequent inventory. As the purpose of the stub is to designate that the material, to which it is attached, has been counted, confusion will arise and material may be overlooked unless all old stubs are removed prior to the inventory. This work is quite expensive and hence concerns make it a practice to adopt different colored tags from year to year. This last method has been found very satisfactory.

Reporting the Quantity.—A unique method of preventing serious errors on the part of tag writers when reporting *quantity* on the tag is to allow two spaces on the tag for *quantity*. These spaces should be separated from each other. Tests and experience both show that this method is an excellent one for overcoming errors in recording the count. The purpose of writing the quantity twice in different parts of the tag has the effect of the tag writer checking against himself.

Routing of Inventory Tags.—In order that each individual in the inventory organization may be familiar with the complete route taken by an inventory tag during the inventory the supervisor should prepare a short explanation of the "Routing of Inventory Tags" and distribute copies to all concerned.

The following illustrates the form which this explanation should take:

First Operation.—All inventory tags are to be issued from the clearing house and the custodian will be responsible therefor. Prior to the inventory the inventory supervisor will deliver to the former all the tags to be used. In order to assure himself that no tags are missing the custodian upon receiving the tags from the supervisor verifies the sequence of the tag numbers. He then apportions a sufficient number

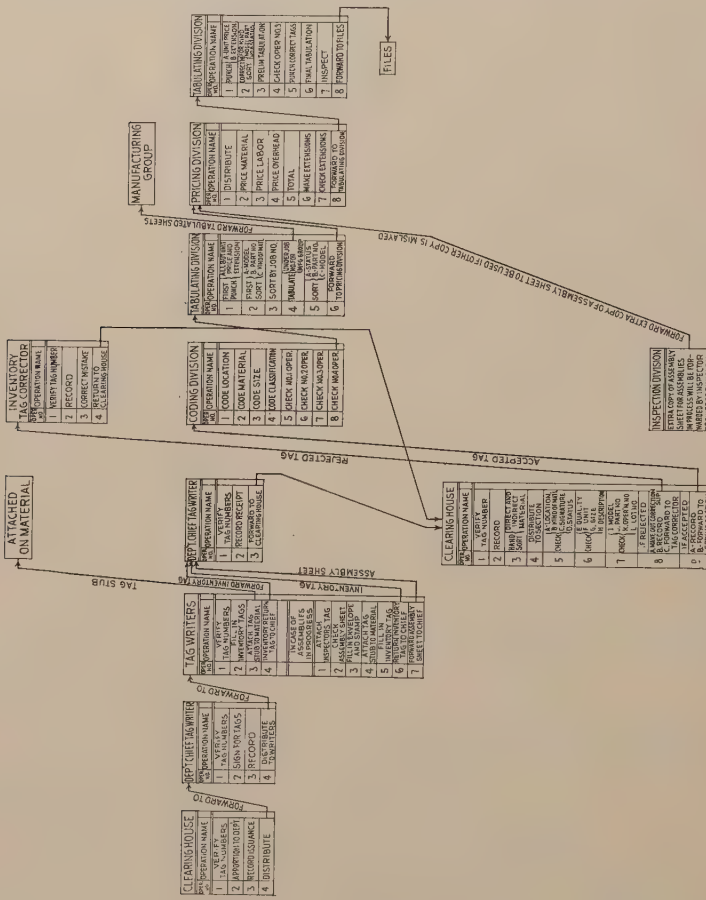


Fig. 21.—Routing of inventory tags.

of tags for distribution on the first issue of the first inventory day and at the same time effects so to control his tag distribution that too large a number of such tags will not be outstanding at any time during the course of the inventory.

Second Operation.—On the first day of the inventory each department chief tag writer receives his inventory tags from the custodian. Tags issued to department chief tag writers are charged to them and they are

held accountable for the return of every tag whether used, spoiled, torn, or voided. *Every* tag issued must be returned to the clearing house whether used or unused. Upon receiving the tags each department chief tag writer must verify the sequence of the tag numbers in order that no dispute may subsequently arise concerning the issue.

Third Operation.—After checking the serial numbers of the tags and signing Delivery Slips, the department chief tag writers proceed to their respective departments where the tag writers assigned to them are to report. The former then distribute the tags, giving each tag writer not more than 25 tags. As each tag writer is responsible to his department chief tag writer for the tags he receives he must verify the sequence of all tag numbers in order to assure himself that no tag is missing.

After filling in the inventory tags completely and with due care that the stubs are securely wired to the material, tag writers, from time to time, return the completed tags to their chiefs.

Fourth Operation.—All inventory tags, whether used or unused are returned by the tag writers to their department chief tag writers. In the case of assemblies-in-process, tag writers must deliver to their chiefs, assembly sheets which have been placed in assembly sheet envelopes. Upon receipt of the tags department chief must verify the tag numbers, record the receipt, and deliver them to the clearing house (whenever enough have accumulated) arranging them in numerical order before delivery in order that the custodian may check the return without difficulty. In some cases several tags may be outstanding at the time the department chief tag writer returns a block of tags to the clearing house. As tag writers, however, are instructed to use tags in sequence of tag numbers there is no reason why all should not be returned in the order in which received. It is one of the duties of the department chiefs to insist upon this point.

Fifth Operation.—Upon receiving the tags from the various departments the custodian must not acknowledge receipt until he has verified every tag number. When this verification has been completed he then sorts the tags according to direct and indirect material. In case there is any uncertainty whether the material, as reported, is direct or indirect, such tags must be laid aside temporarily until the matter may be correctly determined.

After sorting, the custodian delivers the tags to the direct material and indirect material checkers respectively. These checkers then commence to verify the written information.

Two things may happen to the inventory tags upon checking:

1. The tags may be accepted as correct.
2. The tags may be rejected because incorrect or incomplete.

If the tags pass inspection they are then transferred at once to the coding division.

In the process of checking if any information is discovered to be incorrect or incomplete, the checkers must reject the tags immediately and not allow them to pass to the next checker. When tags are rejected, correction slips must be filled out and attached to the rejected tags. They are then collected by the chief tag corrector and sent with the original correction slips attached to the tag correctors located in those departments where the material shown on the tags has been inventoried.

The chief tag corrector detaches the duplicate copy of each correction slip and files these copies in sequence of tag number under the various department numbers or names. When the corrected tags are returned to him, he then removes the duplicate correction slips from his file and thus maintains a control of all tags which are outstanding in the hands of tag correctors.

Sixth Operation.—Tags rejected for inaccuracies or incompleteness are delivered to the tag correctors for corrections. Attached to each inventory tag is a correction slip which describes the error committed on that tag. The tag corrector first compares the tag number with the correction slip and then proceeds to locate the material and correct the error. He must determine the true facts in the case. After making the necessary correction he returns the corrected inventory tag with the original correction slip to the chief tag corrector. Before returning the tag, however, he must sign the correction slip on the reverse side in the space allotted for his name and the date.

Seventh Operation.—All tags which have been inspected by the checkers and found correct, whether on the first inspection or after correction by the tag correctors are then forwarded to the coding division. The first operation to be performed by this division is that of coding the location number. The next operation is that of coding the material number, etc.

Eighth Operation.—The coding division after they have completed their work deliver all tags to the tabulating division. The first operation of this latter division is to sort and arrange the tags for quick pricing by the pricing division. One part of this sorting operation is to arrange all parts of the same number together so that the pricing division, by reference to its pricing card once, may price *at one time* all inventory cards reporting the same part number. This procedure likewise pertains to all kinds of raw material which by means of code numbers may be sorted together quickly.

Ninth Operation.—The pricing division should commence its pricing upon receipt of the inventory tags from the tabulating division. This may best be done by first distributing the tags to the proper sections—that is, Direct Material tags to the direct material pricing section, and the Indirect Material tags to the indirect material pricing section. The tags are then priced by means of such records as this division has avail-

able. When tags are priced they are then extended and extensions rechecked.

Tenth Operation.—When all tags have been priced, extended and checked, they are returned to the tabulating division where such tabulations of the complete inventory as are required are made. Tabulations are prepared, not only for administrative departments, but also the planning, production, manufacturing, and any other departments requiring them.

After all tabulations have been completed the tabulating division is responsible for the proper and permanent filing of the inventory tags. This last operation is important especially in view of the present income tax requirements with respect to inventory records.

Instructions Pertaining to the Inventory Tag.—The following instructions pertaining to inventory tags are applicable to most inventories:

1. Different colored tags should be used for reporting the various main classes of material and supplies. These classes are as follows:

a. Direct Material—Other than Work-in-process.
b. Direct Material—Work-in-process.
c. Indirect Material.

2. The inventory tag should be designed to allow spaces for the following information:

a. Tag number.
b. Location—building.
c. Location—department.
d. Location—bin number.
e. Name of material or part.
f. Material or part number.
g. Kind of material.
h. Status of material.
i. Description.
j. Size.
k. Model or type.
l. Quantity.
m. Unit of measure.
n. Material cost—unit and total.
o. Labor cost—unit and total.
p. Overhead cost—unit and total.
q. Total cost.
r. Extension.
s. Rate of overhead.
t. Status determined by.

u. Tag written by.
v. Priced by.
w. Extended by.
x. Checked by.
y. Code numbers.
z. Date.

3. The inventory tag for Direct Material—Work-in-process in addition to the above should be supplied with the following spaces:

a. Operations which have been completed.
b. Last operation—name or number.
c. Machine or process at which located.
d. Lot, job, or order number.

4. Each tag should be given a serial number. In order to prevent confusion in tag numbers only one series of numbers should be used. If a separate series of numbers is assigned to each of the three kinds of inventory tags it will be difficult for the custodian to account correctly for tags issued and returned. Accounting for tags will be made more certain if a specified range of tag numbers is assigned to each kind of tag. For example: Direct Material (other than Work-in-process) may be assigned tag numbers 1 to 10,000; Direct Material (Work-in-process), tag numbers 10,001 to 15,000; Indirect Material, tag numbers 15,001 to 25,000.

5. Each tag should be accounted for both at the start and at the end of the inventory.

6. Tags should be charged to those to whom they are issued and those persons alone should be held responsible for any tags lost or destroyed.

7. Under no circumstances is any tag to be destroyed, lost, or loaned to or borrowed from another tag writer.

8. All void unused, spoiled, or canceled tags must be returned to the clearing house and accounted for in the same manner as good tags.

9. Any tag spoiled by a tag writer should be marked "void" across the front face and returned to the clearing house.

10. Separate tags should be used for individual lots of material.

11. Each tag should describe but *one* kind of material. Under no circumstances should more than one kind of material be reported on a tag.

12. Work-in-process tags should show all operations that have been completed and should be certified to by the identification stamp of an inspector.

13. Indirect Material tags should describe the materials and supplies in such detail that they can be accurately priced.

14. In order to facilitate the issue of tags they should be wrapped in blocks of 25, 50, or 100.

15. Tags should be issued to the various department chief tag writers in no larger quantities than absolutely required. An excessive amount affords an opportunity for losing tags.

16. The first issue of tags to each department chief tag writer on the first morning of the inventory should be determined as follows: Multiply the number of individual tag writers assigned to each department chief tag writer by twenty-five. This will allow each tag writer to start with 25 tags which is sufficient number for one person at any time.

17. As department chief tag writers require additional tags from time to time they are to obtain them from the clearing house but only after signing a receipt therefor.

18. Each issue of tags from the clearing house, whether 25, 50, or 100, or in any multiples thereof, must be given an identifying issue number which will designate a specific block of tags until returned and accounted for in its entirety.

19. As each inventory tag is written by a tag writer he should detach at once that portion which is to be returned to the clearing house and wire the stub securely to the material. He should not allow complete tags to remain on the material until all material in the department has been inventoried. Instead he should detach each tag as he writes it, leaving the stub to indicate that the material has been counted.

CHAPTER V

THE INVENTORY CLEARING HOUSE

Definition and Functions of an Inventory Clearing House.—An inventory clearing house may be defined as that division of an inventory organization responsible for the accountability, correctness, and completeness of all data on the inventory tags. It is that division of the organization through which each completed inventory tag must pass and be cleared before it can be priced. Its functions may be summarized as follows:

1. To issue and receive back all inventory tags, and to maintain at all times records for their accountability.
2. To check all information written on the inventory tags by verification with bills of material, drawings, operation sheets, assembly lists, specifications, and other data.
3. To direct and assume responsibility for correcting inventory tags which have been found to be incorrect or incomplete in description.
4. After checking, to release for coding, pricing, and tabulating, all inventory tags which bear complete and accurate information.

Need for the Inventory Clearing House.—The need for an organization to examine and check every inventory tag for accuracy and completeness of description before pricing may sometimes be questioned. These few advantages alone justify a clearing house:

1. Every tag is accounted for.
2. Every bit of information written on the tag is subjected to a thorough examination and check.
3. Inaccurate tags are detected and corrected at once.
4. No tag is cleared until the description reported is satisfactory and sufficient for proper pricing.
5. The usual complaint of the pricing division, that it is unable to price tags because essential information is lacking, is removed.

Organization of the Clearing House.—This division of the inventory organization should be headed by one who is directly accountable to the inventory supervisor. He should have

assigned to him the following assistants who assume direct charge of their respective sections of the clearing house:

Assistant Custodian of Inventory Tags.
Assistant Direct Material Checking.
Assistant Indirect Material Checking.
Assistant Final Verification of Tags.

The custodian is responsible for the issue and receipt of all inventory tags. One of the duties required of him is that of maintaining records which permit him to know at all times the exact location of every tag—whether they are in the hands of the tag writers, or have been returned to the clearing house by the department chief tag writers for examination. Before issuing any tags he should satisfy himself that every tag has been serially numbered. He should issue tags in blocks of 25, 50 or 100, and should require in every case a receipt from the department chief tag writers. Upon the return of the tags from the various departments, he should give receipts to the department chief tag writers. He should also be responsible for supplying inspectors, tag writers, foremen, and checkers with necessary forms, stationery, pencils, clips, wires and other inventory equipment. A sufficient number of employees should of course be assigned to him to allow the work of issuing, receiving, and recording of tags to proceed without confusion or loss of time on the part of either the clearing house checkers or the department chief tag writers.

The assistant in charge of direct material checking should be responsible for the proper and accurate checking of data on all inventory tags upon which direct material has been reported. He should be furnished with a sufficient number of assistants so that tags in this section will not accumulate and prevent a steady flow to the coding division. Instead of allowing one person to check the entire information found on the tag, he should so place and arrange his checkers that one group may check a certain specific part while other groups may check other sections of the tag. For example, one group may be assigned to verify location, kind of material, signatures, and status of material; a second group may be assigned to verify quantity, unit, size, and description; a third group may be assigned to verify model, part or material description, lot number, and operation.

The assistant in charge of checking indirect material should be responsible for the proper and accurate checking of all inventory

tags upon which indirect material has been reported. As in the case of checking direct material, sufficient personnel should be assigned to this work to insure a progressive inspection and verification of all inventory tags upon which indirect material has been reported.

The assistant in charge of corrections is responsible for correcting all inventory tags indicated by the direct or indirect material checkers as incomplete or inaccurate. He usually has assigned to him a number of assistants who pass back and forth between the clearing house and the various departments making corrections on the inventory tags after actually inspecting the material, which has been reported incorrect or inaccurate.

The assistant in charge of final verification is responsible for the final examination of all inventory tags prior to their release by the clearing house to the coding division. This assistant should be familiar not only with direct material but also with indirect material, and should be able by a quick inspection of the inventory tags to note any unusual or flagrant errors or omissions.

Operation of the Inventory Clearing House.—It is customary to set aside for the use of the inventory clearing house an office which is as centrally located as possible to all departments of the plant. Prior to the day on which the inventory commences, the clearing house should be properly arranged and a specially designated desk should be placed where the department chief tag writers may obtain inventory tags or other necessary supplies. For the first issue of inventory tags the quantity blocked out for each department and issued at the start is generally an amount established by the multiplying of the number of tag writers assigned to each department by twenty-five. This will allow each tag writer to commence the inventory with 25 tags which is generally sufficient. For example, if the department chief tag writer in department "A" has under his supervision 10 tag writers then the custodian in the clearing house should issue to him, as the first issue on the first day of the inventory, 250 inventory tags. After once receiving their first issue, department chief tag writers may obtain additional tags at the clearing house from time to time, but the purpose of apportionment at the start is to prevent confusion, loss of tags, and loss of time in getting the inventory under way.

On the day the inventory commences all department chief tag writers call at the clearing house for the inventory tags which

have been apportioned for them the day prior to the inventory. After verifying the quantity and serial numbers of the inventory tags for which they will be held accountable, each department chief tag writer is required to sign a receipt—Inventory Tag Delivery Slip. These receipts are the means of holding them accountable until every tag under each issue has been returned. These receipts are recorded by issue number on the Record of Inventory Tags Issued.

It is a cardinal rule in the matter of physical inventories that every inventory tag shall be accounted for at any time and that none shall be destroyed, lost, or loaned to or borrowed from another tag writer.

When tag writers in each department have filled in the inventory tags in accordance with the description and quantity of material inventoried, the completed tags are then returned to the department chief tag writers, who in turn furnish them with additional blank tags. The department chief tag writers, from time to time return the completed inventory tags to the clearing house where the custodian, after verifying the tag serial numbers returned, renders a receipt. This receipt cancels accountability for the tags returned.

Most physical inventories of any size require more than one day to complete. Consequently it is necessary to adopt a method whereby inventory tags may be properly protected during the night and issued without delay on the following morning. In this connection the following procedure works quite satisfactorily:

Tags Outstanding.—If any of the tag writers have blank tags on hand at the end of the day they place these in an envelope, which is supplied to them, and upon which their name is clearly written. This envelope is then delivered to the department chief tag writer who delivers the envelopes in a vault for safe keeping during the night. He should arrange them in such a manner that no loss of time is experienced the following morning when these envelopes are returned to the respective chief tag writers.

Tags in Process of Being Checked.—All tags which are in the process of examination in the clearing house are gathered in boxes by the custodian at the end of the day and deposited in a vault for safe keeping during the night. In gathering these tags care should be exercised so that the sequence of the work of the checkers is not disturbed. If each checker is furnished with an individual box upon which his name is written, he is able to commence work on the following morning exactly

where he left off the previous day. This saves time and prevents confusion.

It has been found advisable to issue tags in blocks of 25, 50, or 100 in order to insure the control of tags at all times. This is easily done by wrapping and binding each block of inventory tags with a narrow strip of paper and writing thereon the serial numbers of the first and the last tags. When tags have been completed by the tag writers, they are returned to the clearing house in blocks of 25, 50, or 100 which again will facilitate their check in by the custodian.

Every inventory tag of an issue may not be used. In a case of this kind the used and unused inventory tags are placed together in numerical sequence in the same block and returned to the clearing house with a slip attached giving the serial numbers of the unused inventory tags. The receipt required upon issue and the receipt given upon return afford the custodian a means for accounting for each tag, and at the same time for checking up any person failing to return all tags issued to him.

The custodian, after all tags have been returned, prepares a schedule showing the names of all department chief tag writers to whom tags were issued, the number of used tags returned, the number of unused tags returned, and the number of tags void or canceled returned. The sum of these three should equal the number of tags issued. Unless unusual complications arise the number of tags finally priced by the pricing division should be the same as the number of *used* tags certified to by the custodian.

Distributing and Checking Tags in the Clearing House.—Upon the return of the tags to the clearing house from time to time, the custodian, as stated above, verifies the tag numbers and renders a receipt. The tags are then ready for distribution to the clearing house checkers. This is accomplished by one of the assistants who sorts the tags as to direct material and indirect material, and then delivers them to the respective checking sections.

The direct material checkers check only those inventory tags upon which direct material has been reported. These checkers are usually so assigned that all data with respect to one item is centralized at one point. This method of checking is far superior to the method whereby one man attempts to check all the data on the inventory tag. By dividing the checking of inventory tags more accurate work is performed and time is saved. The

indirect material checkers perform their duties of checking in a similar manner.

In order that all tags may be properly verified, checkers are furnished with all essential information. Examples of what information should be placed in the clearing house for reference, are:

1. Blue prints.
2. Specifications.
3. Bills of material.
4. Operation sheets.
5. Assembly lists.
6. Catalogues of product and parts.
7. Assignment lists of tag writers by locations.
8. Schedule of purchased parts.

Data necessary for checking inventory tags upon which indirect material has been reported:

1. Schedule of operating and maintenance supplies.
2. Schedule of consumable tools.
3. Assignment lists of tag writers by locations.
4. Location of supply stores.
5. Catalogues of supply houses.

In examining tags checkers will find their time conserved when dealing with errors or omissions by use of the Correction Slip (see page 75). Checkers discovering errors indicate them on this form by placing a mark opposite the name of the error in question. At the same time they place an imprint of their stamp (each member of the clearing house organization is usually provided with a rubber stamp bearing a number identifying its user) on this form. The incorrect inventory tag with this form attached is then ready for action on the part of the tag corrector.

This corrector, at certain times during the day, collects incorrect tags laid aside by the checkers, and after sorting by locations turns them over to the various tag correctors working under his supervision in the respective departments in order that tags originally written in those departments may be corrected.

The correction slips mentioned above are printed in duplicate in order that the chief tag corrector, by means of the copy which he keeps, may account for every inventory tag that has been

returned to the departments for correction. When the inventory is completed these correction slips are sometimes tabulated, for they furnish valuable information. They afford a means of ascertaining the total number of errors committed during the

TABULATION OF MISTAKES ON INVENTORY TAGS DISCOVERED BY INVENTORY CLEARING HOUSE CHECKERS AND CORRECTED BY TAG CORRECTORS

Inventory, December, 1924

Error	Number	Per cent to all errors
1. Model Omitted	26	1.03
2. Location Omitted	25	.99
3. Quantity Omitted	83	3.27
4. Unit Omitted	21	.83
5. Kind of Material Omitted	12	.48
6. Size Omitted	53	2.09
7. Description Omitted	14	.56
8. Part Number Omitted	85	3.35
9. Tag Writer's Number Omitted	20	.79
10. Status Omitted	7	.28
11. Wrong Unit of Measure	6	.24
12. Wrong Model	24	.95
13. Wrong Part Number	1,003	39.46
14. Wrong Location	14	.56
15. Wrong Status	2	.07
16. Wrong Size	10	.40
17. Wrong Description	1,032	40.52
18. Wrong Inventory Tag	5	.20
19. Incomplete Description	4	.15
20. Miscellaneous	96	3.78
Total	2,542	100.00

Total Number of Tags Used	38,701
Total Number of Incorrect Tags	2,542
Percentage	6.5

(This tabulation prepared at the conclusion of the inventory by the Chief Tag Corrector and submitted to the Inventory Supervisor.)

inventory, and particularly what errors were chronic. An inspection and study of this report allows the experience of the inventory to be utilized for the next inventory. This should assist in reducing errors in the next inventory to a minimum.

When all tags have been corrected by the tag correctors they are returned through the chief tag correctors to the material checkers who again proceed to verify all information thereon. Tags, when finally approved by the checkers, are transferred to the final verifier who glances over each one in order to catch any omission or error overlooked by the checkers. After verification he affixes his stamp to the tag. A count of the inventory tags which pass through his hands should equal the quantity of inventory tags certified to by the custodian as having been used and returned by the department of chief tag writers.

Special Comments on the Clearing House.—Usually at the beginning of the first day of the inventory the work in the clearing house is not well balanced. This has reference particularly to the custodian who is very busy issuing tags and to the checkers whose work does not start until inventory tags have been returned for examination. It will prove of material assistance if the chief in charge of the clearing house assigns a few checkers to assist the custodian during the first hour or two. After that time enough tags will have been returned to allow the checkers to commence their own particular work. Because of the temporary organization of the clearing house it is natural to look for a certain amount of confusion. This may be reduced to a large measure by insisting that all but a few checkers, who are to help the custodian, report at the clearing house an hour later than the regular commencing hour. This rule should be enforced for the first day of the inventory only, as enough inventory tags will be returned from that time on to keep the checkers well engaged.

The chief of the clearing house should make it his duty to glance over all inventory tags that are returned during the morning of the first day. By so doing he will learn the nature of the flagrant errors and omissions that are being made by the tag writers. As a result he can notify at once the department chief tag writers of the names and locations of tag writers who are violating instructions. This allows correcting the work of the tag writers at the start of the inventory, and thus results in a great saving of time on the part of the checkers and tag correctors later on. If tag writers get off well during the early part of the inventory, correct work is obtained during the remainder. If, however, they are permitted to continue making errors or omissions during the entire inventory, it means extra work for the checkers and burdens the tag correctors to an extent which

delays inventory tags getting to the pricing division. A little precaution at the start will save a great deal of time and trouble later on.

RETURNED INVENTORY TAGS

Issue number	Date returned completed	Issued to	Location symbol	Tags issued			Tags returned				Lost
				From	To	Quantity	Used	Unused	Void	Total	
1	1/3/23	Whalen	D	1	500	500	500	...	..	500	
2	1/3/23	Jones	A	501	800	300	296	...	4	300	
3	1/3/23	Murphy	B	801	1,200	400	390	5	5	400	
4	1/3/23	Black	E	1,201	1,500	300	289	10	1	300	
5	1/3/23	Whalen	D	1,501	2,000	500	490	...	10	500	
6	1/4/23	Iwig	F	2,001	2,400	400	380	12	8	400	
7	1/4/23	Lawton	H	2,401	2,600	200	198	...	2	200	
8	1/4/23	Murphy	B	2,601	3,000	400	390	10	..	400	
9	1/4/23	Jones	A	3,001	3,500	500	497	...	3	500	
10	1/4/23	Black	E	3,501	3,700	200	190	3	7	200	
11	1/4/23	Whalen	D	3,701	4,000	300	295	5	..	300	
12	1/4/23	Iwig	F	4,001	4,400	400	305	90	5	400	
13	1/4/23	Murphy	B	4,401	4,700	300	260	40	..	300	
14	1/5/23	Lawton	H	4,701	5,000	300	290	5	5	300	
15	1/5/23	Black	E	5,001	5,200	200	150	48	..	198	2
16	1/5/23	Whalen	D	5,201	5,400	200	110	90	..	200	
						5,400	4,030	318	50	5,398	2

(This report prepared by the Custodian for the Inventory Supervisor.)

On account of the large number of employees which usually write tags, care must be exercised to see that a sufficient number of checkers have been assigned. Otherwise the operation of checking will necessarily continue several days after the physical count has been finished and the departments released for production. Where it is necessary that production start and material be moved as quickly as possible after the inventory is completed, inventory tag correctors will have difficulty in locating material if it has been incorrectly inventoried. The approximate number of tags to be used and the period of the inventory are two means for gaging the number of checkers required. Past experience should indicate approximately how many tags may be checked by one checker in one day and with the knowledge of the approximate number of tags to be used and the number of days to be given to the inventory, the number of checkers required to complete the work in the allotted time may be determined.

Inventory Tags "Voided."—Inventory tags once issued from the clearing house may be marked "void" either (*a*) in the factory or, (*b*), after they have been returned to the clearing house as "good" tags but before they have been tabulated.

When tags are voided under situation (*a*) they should be returned to the clearing house and accounted for in the same manner as "good" tags. All such tags should be accompanied by their respective stubs, for if the latter are allowed to remain attached to material such material will not be included in the inventory. The inventory tag stub signifies that the material has been counted and reported. The voiding of the inventory tag calls for the voiding of its stub, and the return of these two sections of the original tag to the clearing house.

The treatment of tags voided after they have been received back from the factory by the clearing house as "good" tags ("b" above) deserves special explanation. During the course of verifying the correctness of inventory tags by the checkers in the clearing house, tags returned as "good" tags may be voided for anyone of the following reasons:

1. The material reported is consigned material.
2. The material reported was not to be inventoried.
3. The material reported is not a proper inventory item, *i.e.*, a plant item or a charge already made against earnings.

Where tags are thus voided should certain restrictions obtain. Otherwise there is always the possibility that materials which should be included in the inventory will, through error or intent, be omitted from the final figures. The following instructions applicable to the voiding of tags after their receipt in the clearing house should be insisted upon:

1. Permission to void a tag should first be secured from the inventory supervisor. The latter should sign his name on the reverse side of the tag.
2. The word VOID should be written in large letters across the face of the tag.
3. The tag should be signed and dated by the person voiding it.
4. The reason for voiding the tag should be given.

All tags which have been voided for one reason or another, whether during or after the inventory, should be carefully preserved for future reference. Such tags should be accounted for at all times in the same manner as "good" tags.

Information from Records Kept by the Clearing House.—If forms are properly designed to record the issue and return of

inventory tags, valuable schedules may be prepared at the termination of the inventory which may be used to advantage in preparing for the next inventory. For example, one schedule may show the number of tags used in each building, department, storeroom, or section. Another schedule may show the number of tags written by each tag writer. The latter establishes a basis for determining the average number of tags written per day by each tag writer. This information may be used to very good advantage in a subsequent inventory when the problem arises of deciding upon the total number of tag writers required and the number required for each department.

STATEMENT OF INVENTORY TAGS

Inventory Dec. 31, 1923

Tags Charged to Custodian:

	Number of Tags
Direct Material (Other than Work-in-process) Nos. 1 to 20,000	20,000
Direct Material (Work-in-process) Nos. 20,001 to 30,000	10,000
Indirect Material Nos. 30,001 to 40,000	10,000
Total Tags Charged to Custodian	40,000

Tags Accounted for by Custodian:

Direct Material (Other than Work-in-process):			
1. Unissued		5,400	
2. Issued:			
a. Used	13,621		
b. Unused	892		
c. Void	85		
d. Lost	2	14,600	20,000
Direct Material (Work-in-process):			
1. Unissued		1,250	
2. Issued:			
a. Used	8,406		
b. Unused	298		
c. Void	46	8,750	10,000
Indirect Material:			
1. Unissued		600	
2. Issued:			
a. Used	9,105		
b. Unused	250		
c. Void	44		
d. Lost	1	9,400	10,000
Total Tags Accounted for by Custodian			40,000

(This statement rendered by the Custodian to the Inventory Supervisor at completion of the inventory.)

Those who have had experience in the operation of a clearing house for inventories are well satisfied that without it physical inventories are far less satisfactory and less accurate. In a recent inventory where the clearing house was part of the inventory organization and where approximately 32,000 inventory tags were used, the clearing house checkers located 2,300 errors or omissions, which if not discovered by them and corrected at once, would have passed on to the pricing division. That division would either have priced these tags incorrectly on account of faulty information, or would have been unable to price them because of lack of information. The inventory clearing house has been found, by experience, to be the only practical means to control the inventory properly from its beginning up to the stage where the inventory tags are turned over for pricing. Experience has also proven that correct physical inventories cannot be established unless absolute control is maintained at all times.

CHAPTER VI

TAKING INVENTORY

The First Day.—No matter how thoroughly each member of the inventory organization has been instructed, confusion is bound to happen during the first part of the first day of the inventory. This is natural because practically every one is required to perform duties which if not entirely new to him are at least not entirely fresh in his mind. Therefore it is necessary that the inventory supervisor should take every precaution to reduce disorder of any kind. The following are several means by which confusion may be materially curtailed:

1. Department chief tag writers should be required to report to the clearing house at least 15 minutes before the opening hour for commencing the count in order that they may obtain inventory tags and be at their respective stations before the inventory commences.
2. All foremen and inspectors who are to supervise personnel should be in their respective departments at least 15 minutes prior to the opening hour.
3. All checkers and coders, with the exception of those who have been assigned by the chief of the clearing house to assist the custodian in the distribution of inventory tags and supplies, should be directed to report one hour later than the hour set for the inventory.
4. No one should be permitted in the clearing house unless on business relative to matters handled at that point.
5. All tag writers and counters should report at a specific place in the department to which they have been assigned.
6. The foreman in each department should assign his counters to work in groups of five or six and the chief tag writer should then assign a tag writer to work in conjunction with each group.
7. The chiefs of all divisions should circulate through the entire plant just as soon as possible on the first day of the inventory to straighten out all difficulties that arise.
8. All chief tag writers, once their men have been assigned to their respective duties should examine the first few tags written to satisfy themselves that the tag writers are doing the work in accordance with instructions.

Cost of Delay.—Whether the cost of taking inventory is great or small the fact remains that the expense is unproductive and reduces the profits accordingly. Hence it is important that the inventory be commenced with the least amount of lost time and be completed within the shortest period consistent with accuracy and completeness. Unless each one in the inventory organization reports promptly to his station and unless all necessary forms and supplies are ready at the commencement, delay is bound to occur. Cases are known where as many as two days have been practically wasted before the organization functioned properly.

All division chiefs should be on hand before the starting hour and should see that employees in their divisons are ready to work when the inventory commences. Once the work has started they should circulate throughout the plant from time to time, to satisfy themselves that instructions are not being violated and to discover if employees are loafing. Any employee wilfully holding the work back should be released from the organization at once.

Tags Written Prior to Inventory Date.—Often-times it is possible to fill in, prior to the inventory date, most of the information required on the inventory tags. As a result the description of the material is generally more accurate and the inventory completed in a much shorter time than when every bit of information to appear on the tags is written at the time the material is counted. The success of this procedure of writing the tags ahead of time—except of course the quantity—is dependent upon how well the material ledgers have been kept and the methods of storekeeping. Usually the procedure is as follows:

a. Some weeks prior to the date of the inventory, inventory tags, are sent to the material ledgers where one tag is written for each kind of material shown in such ledgers. A complete description—name, size, model applicable to, unit weight, part number, etc., is given on each tag for each material, and its *location* in stores noted in the proper section of the tag. The quantity of course is omitted at this time since this must be determined from a physical counting of the material. The unit of measure, however, should be given.

b. After a tag has been written for each material and all tags checked these tags are then sorted by respective locations—not only as to various storerooms but also as to locations within each storeroom. Such sorting is necessary because material ledgers are arranged either alpha-

betically or numerically as to material, parts, or supplies, and not by locations.

c. Tags applicable to each location are bundled and marked (as to location) and held until inventory day when they are distributed in the same fashion as other inventory tags except that those tags applicable to a certain location must be used in that location.

In the instance of raw materials, finished parts and products, and supplies, and where material ledgers and storekeeping can be relied upon, the above procedure can be successfully carried out if the work of writing the tags ahead of time is carefully supervised and then thoroughly checked. In some isolated cases tags can also be written ahead of time for work-in-process. The information desired in such cases is taken from production records—route sheets for example. Unless, however, these tags are written up the day prior to the inventory the accuracy of the information can hardly be relied upon. And even though the information be current there is very little advantage in adopting this procedure for work-in-process. It is best to have *all* information called for in connection with work-in-process written on the tags at the time the material is actually counted.

Counting and Reporting Materials.—Materials should be counted, weighed, or measured in accordance with the instructions pertaining to materials. Arbitrary procedures by tag writers in reporting materials must not be permitted. It is necessary for the department chief tag writers, therefore, to supervise the work of their tag writers carefully. They should see that lot numbers for parts-in-process are recorded, also all operations, and the machine at which the material is located. In the case of assemblies-in-process it should be insisted that the assembly sheets show not only the parts in the incomplete assembly but also the number of labor hours already expended in assembling.

Raw materials should be reported in the units of measure required by the pricing division. In some cases, however, a great deal of time may be saved by using a unit of measure different than the unit needed for pricing. Bar stock, for example, may be inventoried more readily and quickly in units of feet than in pounds, although the latter unit is generally used in purchasing and pricing.

The supervisor may shorten the time required for actual counting, weighing, and measuring by having a list prepared

prior to the inventory which shows those materials which may be reported in units at variance with the pricing unit. This list should record the name of the material, the pricing unit, the inventory unit, and the name of the table necessary to convert one unit into terms of the other unit. These lists should be distributed to all tag writers.

In order that the pricing division may perform its work properly it is then necessary to convert the unit of count, weight, or measure into pricing units. This work should be done in the clearing house by an employee known as the "Converter of Units of Measure." He should be supplied with tables of weights, by means of which he may convert units used in the factory into units required by the pricers.

The chief of the physical count division should satisfy himself that mechanical equipment for weighing or counting is advantageously used. In many instances employees are allowed to count small articles like bolts, nuts, springs, washers, etc., by individual pieces. In most cases this procedure is a wilful waste of time and money since computing scales can accomplish the same results just as accurately from a practical standpoint, and many times more quickly. If a sufficient number of such scales are not available prior to the inventory the supervisor should request that additional equipment of this kind be purchased or borrowed. The cost of these machines is easily repaid not only on account of the time saved during the inventory but also on account of the accuracy of the count. In addition they are most useful during the operating year. Too little attention is usually given in applying these machines to the inventory.

Operating and Maintenance Supplies.—In inventorying electrical, plumber, millwright, carpenter, mason, and other special supplies, descriptions will be more accurate and complete if electricians are assigned to count electrical supplies, plumbers assigned to count their supplies, and so on. Naturally these employees are more competent to pass upon those supplies with which they come in daily contact than are others not so familiar with them.

Extra machine repair parts require a very complete and careful description. In many cases a sketch on the reverse side of the inventory tag is helpful to the pricer. As this class of supplies is one of the most difficult to price, the tag writer should report

every bit of information possible: the maker's name, part number, name, use, type, shape, size, model, and machine used on.

Material Counted Ahead of Time.—Every practical means should be availed of to bring the physical inventory to a completion in the shortest possible time consistent with dependable results. A means to this end is the counting, weighing, or measuring of certain materials ahead of time, consideration of course being given to such additions and withdrawals between the date of actual count and the date of the inventory. This does not mean that every material may be counted ahead of the date of the inventory nor that the period of time prior to the inventory date is of no consideration. Generally, material which can safely be counted ahead of time is material such as bar stock and similar material of great weight which is difficult to weigh or measure quickly.

The date of actual weighing or measuring should not be too distant from inventory date. A month should be the maximum period permitted. Between these two dates an accurate record must be kept on a tag attached to the material of all receipts, whether by purchase or return to stores on credit requisitions, and also all withdrawals. This net figure may be used for inventory purposes and for all practical purposes, if proper control is maintained, it should be as correct as if an actual count were taken on inventory date.

Changing Information on the Inventory Tag.—Unless proper control is exercised, members of the inventory organization are apt to make unauthorized changes in the inventory tag. If this is permitted then an opportunity is presented for affecting the accuracy of the final figures. Because of the serious results that can arise under such circumstances the supervisor should issue instructions that no changes or erasures of information are permitted except by tag correctors or those other members of the inventory organization who may make necessary changes when so advised in writing. These instructions should not prevent checkers in the clearing house from *adding* any necessary information that may be required for pricing. According to instructions checkers are allowed to make changes in special cases.

Shipping Material.—In many cases it is absolutely necessary that material be shipped from the plant during inventory. Despite the necessity for keeping shipments down to a minimum during the inventory there is always a tendency on the part of

certain departments to consider every order urgent and to insist that it be shipped at once. It should be the duty of the supervisor to prevent unnecessary shipments by insisting that all shipping orders bear his approval before the material is permitted to leave the plant.

Stampeding the Inventory.—Although prior to the inventory explicit instructions may have been issued to all executives informing them that no material is to be moved nor any machines operated during the inventory, such instructions are quite often violated. During the first day of the inventory no trouble of this nature usually arises, but on subsequent days the supervisor will often discover either that material is being moved in preparation for resuming production, or that machines are being operated on certain work. Such violations stampede the inventory by disrupting the inventory organization. Without giving notice certain persons fail to report to their stations; others absent themselves from inventory work for one or more hours; and one by one the personnel are transferred to fill in the gap until it becomes practically a hopeless task to complete the inventory within the required time.

There is practically only one way to combat such violations. Upon receiving notice of the first irregularity the supervisor should confer with the highest official in the plant and request that immediate action be taken to stop all violations. If officials would only realize that added expense and unsatisfactory results are caused by violations of this nature, they would be less inclined to grant exceptions during the inventory period. If these irregularities continue the time required to finish the inventory will be easily doubled. It is poor policy for the supervisor to delay immediate action once he has learned of the infraction of instructions.

Penalty for Losing Tags.—Because a lost inventory tag may record a large quantity of high-priced material and because its value may cause a serious error in the final inventory figures, it is necessary that each employee be thoroughly impressed with the importance of protecting his tags at all times. Even after unusual care has been taken to explain to employees the absolute necessity for accounting for each tag, tags are lost through carelessness. If some penalty is imposed for losing tags and notice given prior to the inventory of the nature of the penalty, better results may be expected.

The penalty to be imposed depends upon the peculiar conditions existing in each concern. Examples of some penalities are:

1. Discharge.
2. Laid off for stated period.
3. A charge against employment record.

Items of Considerable Value.—As previously stated measures should be taken to make every step in the process of arriving at the final inventory figure as "fool-proof" as possible. In this connection it is sometimes advisable to require that certain items of considerable value be reported on separate inventory tags in order that there may be no serious effect on the accuracy of the final figure through the loss of an inventory tag. Should a tag, used to report many items of considerable value, be lost the amount thereof may cause a serious inventory shortage. Although the fact that a tag is lost in the factory is easy to establish by means of properly maintained records in the clearing house, it is not so easy to establish after the tags leave the clearing house to be priced—nor at any time is it possible to determine easily what material was listed on the tag.

Thus for example in the instance of the inventory of a machine tool manufacturer there may be 25 milling machines, identical in every respct, on hand in finished stores. If but one tag be used to report all 25 machines the loss of this one tag will make a serious difference in the final results. To prevent such a possibility from happening each machine should be reported on a separate inventory tag. Instead of one tag there would be twenty-five tags, and although there is more work attached to the latter method the results obtained usually justify its use.

Reissuing Inventory Tags.—When department chief tag writers return unused inventory tags to the custodian, the latter should not under any circumstances, issue these tags again. By reissuing tags once issued but *unused* the custodian will cause endless trouble for himself when he attempts to complete his records and to prepare his statement of tags used. All tags returned unused should be bundled by the custodian; should be identified by the issue number; and should be filed away in case they may be needed to reconcile issues at any future time.

Smoking during Inventory.—During the inventory period no laxity should be allowed with respect to violations of the fire

rules. Quite often many of the employees disregard such rules during the inventory. It should be the duty of the supervisor to have signs posted throughout the plant calling specific attention to the fact that there must be no smoking at any time and that the regular fire rules are not to be violated.

Bin Tags Used as Inventory Tags.—Under certain conditions bin tags are used as inventory tags in reporting materials located in the store rooms. Where this procedure is used the material in a bin is counted, the quantity placed on the bin tag, and the latter forwarded to the material ledgers for pricing. The information on the bin tag is then transcribed to an inventory sheet, the tag stamped "Inventoried," and then returned to the store room where it belongs. It is then replaced in its holder.

Where this method is adopted unusual care must be exercised to prevent the ommission of material from the inventory. This can easily happen through the failure to send in *all* bin tags. If proper precautions are taken there is no reason why this method will not give satisfactory results to the small or medium sized concern. A few of the necessary precautions are:

a. Every material in stores must be supplied with a bin tag prior to inventory date.

b. The description on the bin tag must be complete.

c. Bin tags must be sent to the material ledgers in a uniform manner. This means that they should be removed from their holders in systematic fashion rather than taken at random from every part of the store room.

d. The description on each bin tag should be carefully checked with the description on its account in the material ledger.

e. Each tag should be stamped "Inventoried" before it is returned to the store room to be placed in its respective holder.

f. The store room must be surveyed very thoroughly for the purpose of observing if any material has been ommitted from the inventory.

Extra Precaution by Gate Guards.—During inventory many employees are allowed for the first time to come in contact with supplies and materials which are easily stolen. Because in the course of their work they are not accountable for the protection of these materials, it happens quite often that certain employees find that inventory time affords an excellent opportunity to supply themselves with materials and tools for home consumption. The supervisor will do well to notify the gate guards to exercise great care during inventory period in examining packages

carried out of the plant by employees. If the certain materials are unusually valuable and easily stolen, certain employees may be assigned to watch for any pilfering by those counting or weighing.

Detaching Inventory Tags.—Inventory tags should be detached from their stubs *at the time they are written* and the stubs attached to the materials. One disadvantage of waiting until an entire department has been inventoried before any tags are detached is the possibility of losing tags. A lost tag reporting material of considerable value may cause a serious difference in the final inventory figures. Another disadvantage is the delay occasioned in checking tags in the clearing house. The purpose of checking the tags soon after they have been written is to allow corrections to be made before departments are released for production. If operations commence and materials move before errors are discovered on the tags by the checkers, it is practically impossible to make corrections or to obtain additional information for proper pricing. Inventory tags should be detached, once they are written, and returned as soon as possible to the clearing house for verification of the data recorded thereon.

Clearing the Department.—When material in each department or other location has been counted and tagged, such department or location should not be cleared or the personnel assigned to it transferred, until another thorough examination has been made to see that no material has been overlooked. It is the duty of the foreman to make a systematic examination of every place in his department, taking special care to investigate unopened boxes, barrels, tanks, furnaces and vats. After the foreman is satisfied that no material has been overlooked, he should notify the division chief and wait for the Notification for Transfer of Personnel before releasing any of his men to other departments. If the foreman deems it necessary, he should retain one or two subforemen to assist him in the work which he is required to perform next.

This duty refers to the comparison of the quantity as shown on the inventory tag stub attached to the material with the actual material itself. According to instructions the foreman must inspect each inventory tag, noting the quantity written thereon and estimating to determine if such quantity is approximately correct. The foreman's experience should tell him at once if

any large error has been committed by the tag writer in reporting the quantity. It is not intended that the foreman should again count the pile or lot of material, but it is intended that he should calculate as nearly as possible the quantity that should be in a certain bin or pile and then compare his calculation with the quantity shown on the tag attached. If he discovers any errors he should notify the inventory supervisor at once by use of the Notice of Correction form.

The "Mopping-up" Gangs.—Once the supervisor has received notice that all departments have been inventoried, he should organize several groups of employees, headed preferably by division chiefs, and should instruct them to make a careful inspection of the plant for any material overlooked. A few tag writers should be assigned to each group to record such material found uninventoried. The tags for these tag writers are charged to the supervisor himself by the custodian, and he is accountable for their return in the same way as is a department chief tag writer. The "mopping-up" gangs are able many times to discover materials of considerable value entirely overlooked by counters and foremen.

Release of Personnel.—As inventory work is completed in each department, employees in those departments should be transferred to other departments, or released, depending upon the need for them. Once a department is cleared and the men therein are not needed for other work, they should be released at once, given their gate passes, and sent home. Time may be saved by having a gate pass ready for each employee. These passes may be filled in ahead of time so that when an employee is to be released all that is necessary to be written is the date and hour. In no case should an employee be permitted to loaf about a department once it has been completely inventoried.

CHAPTER VII

CODING THE INVENTORY TAG

The purpose of coding is to facilitate sorting and arranging inventory tags for pricing and tabulating. Coding is performed by substituting arbitrary numbers for certain written data or information for classification purposes. Although information of the same kind from several sources may be grouped without the use of code numbers, classifying may be performed more readily and more accurately by their use. Coding reduces inventory data to terms of numbers, thus reducing the chance of error in sorting.

Code schedules should be prepared when it is decided what information is to be classified. For inventory purposes schedules for location, material, size and status may be used to advantage. The arrangement of these schedules depends upon the information desired. In one case a schedule may be arranged alphabetically; in another case a schedule may be arranged by divisions; while a third may be arranged by size. Whatever arrangement is used an arbitrary code number should appear opposite each item on the schedule. There are no fixed rules for preparing code schedules other than that the information should be complete and the code numbers should be in sequence. Schedules which are incomplete are more of a hindrance than a help. Therefore, if they cannot be prepared in full, they may best be excluded.

Once code schedules are arranged for use the code number for any item of any classification may be easily located. Code numbers written on the inventory tag do not eliminate the necessity of the complete information required, but are supplementary thereto *representing* the same information, but in another form. Subsequent sorting for pricing or tabulating should be performed by use of these code numbers.

It is important in designing the inventory tag to allow spaces for the insertion of code numbers applicable to all information for which code schedules have been prepared.

In the following paragraphs the arrangement of schedules pertaining to location, material, size, and status are illustrated.

Location Code Schedule.—For insurance, personal taxes, corporation and income taxes, and other purposes, a concern may desire to know the quantity and value of materials at various locations, whether these locations be branch houses, distributing points, or in individual buildings or departments of the plant. To obtain the information desired it is necessary that the inventory tags be sorted by location and totaled for inventory value. In order that this sorting may be accomplished quickly and accurately each tag should be given a location code number.

Location code schedules should be arranged to show every possible location in the plant. These locations should be arranged alphabetically, with a code number opposite each. If it is necessary that the total amount and value of material in each building be known, it will be necessary that the schedule be subdivided by buildings. On the other hand, if the same information is required for each department or floor, the schedule should be arranged by departments or floors. The arrangement is naturally dependent upon what information is to be required for final tabulations. For example, if department "A" is given a location code 15, the location code 15 should be written on all inventory tags reporting material inventoried in that department. When final tabulations are made, all tags bearing the location code 15, if totaled, will give the value of all the material in the above department.

Schedules of a general nature are satisfactory until a report for some special purpose is required. Then it is usually found that the code classifications are too broad. It is therefore preferable that location schedules be as detailed as possible, even though their preparation requires more time to accomplish. The following is illustrative of a detailed schedule:

Class	Group	Code No.	Location
1			Arlington Plant
	11		Building No. 1
		111	Department A
		112	Department B
		113	Department C

Class	Group Code No.	Location
2		Buffington Plant
	21	Building No. 1
	211	Department A
	212	Department B
	22	Building No. 2
	221	Department A
	222	Department B
	223	Department C
	224	Department D

Location coding should be performed by an employee assigned to the coding division and the accuracy of his work should be verified by the location code checker assigned to the same division.

Material Code Schedule.—Inventory tags reporting part numbers or assembly numbers require no code numbers for sorting, because the part numbers or assembly numbers themselves can be used for that purpose. Direct Material tags or Indirect Material tags on the other hand, which have no identifying part numbers do require code numbers for sorting purposes if a ready means of arranging is to be afforded. Code schedules for the following materials may be used to advantage:

1. Raw direct materials.
2. Consumable tools.
3. Operating and maintenance supplies.
4. Machine and equipment repair parts.

The first schedule requires that a complete list of raw direct materials be alphabetically arranged and that each separate kind of material be given a code number. Each kind of material may be further classified by shape and possibly by specification numbers. A code schedule for raw direct material may be arranged in this manner:

Class	Code No.	Kind of Material
1000		Steel, cold rolled
	1001	Round
	1002	Square
	1003	Hexagon
	1004	Flat
1100		Steel, hot rolled
	1101	Round
	1102	Square
	1103	Hexagon
	1104	Flat

The code schedules for consumable tools and operating and maintenance supplies should be arranged in alphabetical order. Sometimes supplies may be so coded that the value of those applicable to special departments or divisions of the plant may be summarized. Electrical supplies, for example, may be given an individual code number by means of which the value of all electrical supplies can be obtained by sorting and tabulating by code numbers. The same information may be obtained for plumber, carpenter, mason supplies, etc. As in the other schedules, the arrangement depends upon what information is required from the final tabulations. Since the pricing division generally find it advantageous to arrange their pricing schedule for machine repair parts alphabetically by manufacturer's name, the code schedule for the same supplies should be arranged in a similar manner. Code numbers should be given to each manufacturer of repair parts and these code numbers used for segregating inventory tags reporting this material.

Size Code Schedule.—In many instances size codes are not required. This is especially true where the size of materials is of one dimension only. When, however, sizes are of two or three dimensions, sorting by size under different classes of materials will be facilitated and expedited if code numbers are used. For the purpose of illustration the preparation of code schedules for one, two, and three dimensions will be explained.

One Dimension.—This schedule is arranged by placing a code number opposite each dimension. The first, last and intermediate sizes are dependent upon the kind of materials and supplies to be inventoried. The first size, for example, may commence with $\frac{1}{64}$ inch and the last size may be 20 inches, the range of sizes between being contingent upon the graduation.

It is possible, when the code number is of four digits, to have it also express the dimension itself. The last two digits may be used to express the fraction and the first two digits may be used to express the whole inches. Assuming that the graduations on the schedule are by sixty-fourths, a size of $13\frac{1}{2}$ inches may be expressed by code number 1332. The last two digits express the number of sixty-fourths ($\frac{32}{64} = \frac{1}{2}$ inch); the next two places express the whole inches, or 13.

Two Dimensions.—The code schedule for sizes of two dimensions may best be arranged in tabular form by showing the first dimension on the left-hand side of the table and the second dimension across the top. Code numbers are then filled in opposite each combination of sizes. A schedule illustrating two-dimension code numbers is shown on the following page.

SIZE CODE SCHEDULE

Two Dimensions
Designating Number 2000

First Dimension	Second Dimension								
	1"	2"	3"	4"	5"	6"	7"	8"	9"
1/16"	2001	2002	2003	2004	2005	2006	2007	2008	2009
1/8"	2010	2011	2012	2013	2014	2015	2016	2017	2018
3/16"	2019	2020	2021	2022	2023	2024	2025	2026	2027
1/4"	2028	2029	2030	2031	2032	2033	2034	2035	2036
5/16"	2037	2038	2039	2040	2041	2042	2043	2044	2045
3/8"	2046	2047	2048	2049	2050	2051	2052	2053	2054
7/16"	2055	2056	2057	2058	2059	2060	2061	2062	2063
1/2"	2064	2065	2066	2067	2068	2069	2070	2071	2072
9/16"	2073	2074	2075	2076	2077	2078	2079	2080	2081
5/8"	2082	2083	2084	2085	2086	2087	2088	2089	2090
11/16"	2091	2092	2093	2094	2095	2096	2097	2098	2099
3/4"	2100	2101	2102	2103	2104	2105	2106	2107	2108
13/16"	2109	2110	2111	2112	2113	2114	2115	2116	2117
7/8"	2118	2119	2120	2121	2122	2123	2124	2125	2126
15/16"	2127	2128	2129	2130	2131	2132	2133	2134	2135
1"	2136	2137	2138	2139	2140	2141	2142	2143	2144
1 1/16"	2145	2146	2147	2148	2149	2150	2151	2152	2153
1 1/8"	2154	2155	2156	2157	2158	2159	2160	2161	2162
1 3/16"	2163	2164	2165	2166	2167	2168	2169	2170	2171
1 1/4"	2172	2173	2174	2175	2176	2177	2178	2179	2180

Example

Size		Code Number
3/4" X 3"	***	2102

FIG. 22.—Example of size code schedule.

Three Dimensions.—Very few materials inventoried require three dimensions to record their size. A code schedule for three dimensions, therefore, may best be arranged by test. First list alphabetically all those materials of three dimensions and then code the various sizes under each kind of material. The following example illustrates:

3000	Boxes, Pine
3001	1 × 2 × 2 feet
3002	1 × 2 × 3 feet
3003	1 × 2 × 4 feet
3004	2 × 2 × 2 feet
3005	2 × 2 × 3 feet

Status Code Schedule.—Status of material refers to the condition or state in which material is found at the time of inventory; for example, raw, rough, parts-in-process, assemblies-in-process, etc. It is customary to tabulate the final inventory by *status* in order that the quantity and value of material in various stages of completion may be determined for the production department. If the classes are to be detailed, code numbers for status may be used to advantage. They will help not only the sorting for tabulation purposes, but also the pricing.

A status code schedule may be arranged by listing all the various conditions of material and giving each a code number.

Advantage of Coding.—The value of coding as a time-saving feature and as a means for obtaining more accurate classifications is measured by the number of times the inventory tags must be sorted for pricing and tabulating. If it is necessary that the tags be arranged but once, coding is a needless and useless operation. When it is considered, however, that the tags must be sorted at least twice—once for pricing and again for tabulating, and usually many more times for special reports—its value is quite apparent.

Coding indicates definitely by means of substituted numbers, the classifications within which certain data must fall and, if properly performed not only saves time in pricing and tabulating but also affords a means for accurately classifying any inventory details whether for ordinary or for special purposes.

CHAPTER VIII

PRICING THE PHYSICAL INVENTORY

Pricing an inventory involves the work of supplying to each item of material in the inventory a unit amount which is supposed to represent its conservative value. Such unit value is usually an amount which is either equal to or less than the actual cost of the item. The discussion of value, however, is left to a later chapter. The purpose of the present chapter is to describe and illustrate means which will allow the operation of pricing to be accomplished more accurately and at the same time more quickly.

Pricing cannot be performed in a time-saving or correct manner unless a considerable amount of preparatory work is done before the commencement of the inventory. This work consists chiefly of preparing what is known as pricing schedules, or tabulations of data, accurately arrived at, and properly arranged for ready reference. But before these pricing schedules can be prepared, and in final shape before the inventory actually starts, it is necessary that the following questions should be answered:

1. Who is to prepare the schedules?
2. When are they to be prepared?
3. What is to be the arrangement of each schedule?
4. What schedules are required?
5. What information should each schedule contain?

The cost department usually prepares the pricing schedules, although in many instances a special organization is selected from the auditing department to make an audit of costs and to prepare all prices to be used for inventory purposes.

Concerning the time for preparing the schedules it is quite essential that all cost figures be ready at least a week in advance of the inventory date so that those who are to perform the operation of pricing may be instructed in their use. The amount of data for each schedule is dependent upon the size of the concern and the nature of the product. These factors, together with the facility of obtaining prices, determine how much time

must be given to complete each schedule before the inventory date. Some schedules are so voluminous that possibly a month may be required for their preparation; others may require but a few days. Regardless of the amount of time needed, each schedule should be prepared thoroughly and comprehensively, and should contain unit prices which have been established in accordance with the basis of pricing decided upon by the management.

The arrangement of each schedule is naturally dependent on the information required. A pricing schedule for raw direct materials, for example, should show the unit price in addition to the description. On the other hand a schedule of parts-in-process should show not only the unit material price, but also the unit labor, overhead, and total price. Should there be a large number of items in a schedule, a card index arrangement may be used to advantage. In such cases each item should be carried on an individual card and all cards then arranged in the order desired, by name, number, size, or in any other manner.

The following pricing schedules, with the information required for each, are given in subsequent paragraphs:

1. Raw direct materials.
2. Rough castings, forgings, and stampings purchased.
3. Standard parts purchased.
4. Special finished parts purchased.
5. Special finished assemblies purchased.
6. Special semi-finished parts purchased.
7. Special semi-finished assemblies purchased.
8. Standard parts manufactured.
9. Special parts manufactured.
10. Assemblies manufactured.
11. Finished products.
12. Indirect materials—operating and maintenance supplies.
13. Indirect materials—consumable tools.
14. Indirect materials—machine and equipment repair parts.
15. Scrap materials.

Raw Direct Materials.—The pricing schedule for this class of material is applicable to bar steel, metal sheets, wire, and all other raw materials from which parts are to be fabricated, and should show the various materials in alphabetical order. The following information should appear opposite every item:

1. Code number.
2. Alloy.
3. Shape.
4. Finish.
5. Size.
6. Unit.
7. Unit price.

In establishing unit prices, care should be taken to add to the base prices, all extra charges for quantity, size, multiple or special lengths, and finish.

Rough Castings, Forgings, and Stampings Purchased.—This schedule should include all rough parts purchased, and should be arranged by part numbers under respective models or products. The following information is also required:

1. Part name.
2. Kind of material.
3. Rough weight or size.
4. Unit.
5. Unit price.

Unit prices should include the write-off of the cost of all necessary patterns, forging and stamping dies, and all other equipment billed by the vendor as additional to the cost of the material.

Standard Parts Purchased.—This classification refers to parts that are standard for all users and refers particularly to bolts, nuts, cotter pins, screws, nails and similar items. A price schedule for material of this kind should be arranged alphabetically, and should show:

1. Special description.
2. Size.
3. Unit.
4. Unit price.

Special Finished Parts Purchased.—This schedule should include parts peculiar to the product, purchased in finished condition from other manufacturers. Because of the difference in prices, material of this nature should be scheduled separately from parts of the same symbol or part numbers made by the concern itself. The pricing schedule for this material should show:

1. Part number.
2. Part name.
3. Model or product.
4. Unit.
5. Unit price.

The arrangement of part numbers in sequence under each model or product is a convenient one. In determining the unit price, consideration should be given to charging off into cost the write-off for all pattern, die, and tool work, and any other extra charge by the vendor.

Special Finished Assemblies Purchased.—Assemblies purchased in finished condition from other manufacturers should be scheduled separately. This is most essential where the concern itself makes identical assemblies. The same remarks in regard to the establishment of unit prices pertaining to special finished parts purchased also apply to this class of material. This schedule should be arranged to show:

1. Assembly number.
2. Assembly name.
3. Model or product.
4. Unit price.

Special Semi-finished Parts Purchased.—For parts purchased in a semi-finished condition, it is important that a special schedule be arranged for pricing, especially if parts of the same name and number are manufactured by the concern itself from raw material or rough parts. This schedule should have the following information for each part:

1. Part number.
2. Part name.
3. Model or product.
4. Operations completed upon receipt.
5. Unit.
6. Unit purchase price.
7. Unit labor and overhead cost to complete.
8. Unit cost (6 and 7).

Pattern, tool, die or other additional charges must be considered as additional to the unit prices at which semi-finished purchased parts are billed by vendors, unless such unit prices include such additional charges.

Special Semi-finished Assemblies Purchased.—The same condition that makes it necessary to place parts purchased from vendors and parts made by the concern itself on separate schedules, also makes it necessary that semi-finished assemblies purchased be scheduled separately. The price schedule for this material should show:

1. Assembly number.
2. Assembly name.
3. Model or product.
4. Part numbers and quantity of parts in semi-finished assembly.
5. Unit purchase price.
6. Part numbers and quantity of parts to complete.
7. Unit material, labor and overhead cost in parts to complete.
8. Unit material, labor and overhead cost in assembling operations to complete.
9. Unit cost (5, 7, and 8).

Extra charges by vendors for manufacturing equipment to make parts, and extra equipment for assembly purposes, should be written off into the unit purchase price if conditions warrant such procedure.

Standard Parts Manufactured.—This classification refers to those parts in the product such as bolts, nuts, cotter pins, screws, nails, rivets, etc., which are manufactured by the company from raw materials instead of being purchased from regular manufacturers of this class of material. The schedule may be conveniently used by arranging the part number in sequence under separate models. Complete information in the schedule should show:

1. Part number.
2. Part name.
3. Model or product.
4. Special description.
5. Size.
6. Unit.
7. Kind of material.
8. Unit material cost.
9. Unit labor cost.
10. Unit overhead cost.
11. Unit cost (8, 9, and 10).

Special Parts Manufactured.—Material for this schedule should include all parts made by the company which are special

for the models or products manufactured. These special parts may be made from raw direct materials or from purchased rough castings, forgings and stampings. The following information should be shown on the schedule which should be arranged by listing part numbers under each model or product:

1. Part number.
2. Part name.
3. Model or product.
4. Unit.
5. Unit material cost.
6. Unit labor cost.
7. Unit overhead cost.
8. Unit cost (5, 6, and 7).

In order to price special parts that may still be in process at the time of inventory, this schedule should be supported by records showing the labor and overhead cost of each part at each operation, and in addition the cumulative costs at each operation.

Assemblies Manufactured.—This schedule should contain the same information with respect to assemblies as that shown in the preceding paragraph with respect to parts. In addition, if the cost records are not complete, individual assembly sheets should be prepared for pricing assemblies-in-process. These individual assembly pricing sheets should have the following information for each part entering into each assembly:

1. Part number.
2. Part name.
3. Unit.
4. Unit material cost.
5. Unit labor cost.
6. Unit overhead cost.
7. Number of parts required per assembly.
8. Total material cost.
9. Total labor cost.
10. Total overhead cost.
11. Unit cost.

In conjunction with the above, which should give the complete cost of all *parts* entering the assembly, an assembly operation sheet should be prepared which will show the labor and overhead cost of each operation *of assembling*, and the assembling

accumulated cost at each operation. These records are necessary if assemblies-in-process are to be priced correctly.

Finished Products.—The schedule of finished products should show the following:

1. Product number.
2. Product name.
3. Special description.
4. Unit.
5. Unit material cost.
6. Unit labor cost.
7. Unit overhead cost.
8. Unit cost.

The method of arranging this schedule is dependent upon the kind and type of product manufactured. Some concerns arrange the schedule by product numbers, others by product name, others by type. Each case must be handled as best fits the individual requirements.

Indirect Materials—Operating and Maintenance Supplies.—All supplies necessary for the operation and maintenance of the plant should be included in this list. Commodities should be arranged alphabetically, and the list should show the following:

1. Material code number.
2. Name of material.
3. Description.
4. Size.
5. Unit.
6. Unit cost.

Commodities having more than one size may be arranged on the schedule in their proper section by size.

Indirect Materials—Consumable Tools.—This schedule should include all materials known as consumable tools. The required information should be arranged as described under Operating and Maintenance Supplies, above.

Indirect Materials—Machine and Equipment Repair Parts.—This class of material, although included under Operating and Maintenance Supplies for inventory purposes, should be segregated by coding, for the pricing and tabulating. Repair parts should be scheduled by manufacturer's name, and the manufacturers' names arranged alphabetically. This schedule should show the following with respect to each part:

1. Manufacturer's code number.
2. Manufacturer.
3. Part number.
4. Part name.
5. Description and size.
6. Equipment or machine used on.
7. Unit.
8. Unit cost.

Scrap Materials.—The schedule for this material should show:

1. Name of scrap material.
2. Unit.
3. Current market price per unit.

Materials should be arranged alphabetically and special alloyed metal should be arranged under the main classification for its particular kind of material.

Arrangement of Tags.—Pricing will be greatly facilitated if the inventory tags, before reaching the pricing division, are sorted and arranged in the same order as the pricing schedules are arranged. In fact the inventory supervisor should insist that this be done. Once arranged, the order of the tags should not be disturbed by the pricers.

Visual Price Checker.—In spite of the most careful pains taken to price and to extend such prices correctly, many mistakes are made. The following are a few of the more common errors:

1. Using unit cost of another kind of material or part.
2. Using incorrect cost.
3. Incorrect placing of decimal point in the unit cost.
4. Failure to use the complete unit cost.
5. Incorrect placing of decimal point in the extension.
6. Incorrect extension.

Most of the mistakes will be easily discovered if the description of the material, the quantity, the unit cost, and extension are reviewed by a properly qualified person. For example, an employee from the purchasing department assigned to examine tags reporting indirect material should be able to note any flagrant errors in prices of this class of material. His purchasing experience should enable him to pass upon the fairness of the prices used. In a like manner, other employees may be well

qualified to check the prices of raw materials, parts, assemblies, tools, etc.

The pricing division, then, will find it to their advantage to have within their organization one or more employees, called "visible price checkers," whose duty it should be to inspect every tag for errors in pricing. After price checking, the tags should be returned to the tabulating division.

CHAPTER IX

TABULATING THE INVENTORY

Tabulating or scheduling is the last operation performed before the inventory results are known. This work consists of presenting the inventory data as found on the inventory tags in such form or arrangement that the results originally desired and planned for are obtained. As stated in an earlier chapter the whole scheme of planning, preparing, taking, and pricing an inventory is based upon the results required by the management. Unless it is known in advance of the inventory exactly what statements, schedules, or tabulations are required, planning becomes a useless effort and procedures cannot be prepared which will bring about the desired compilations. The completeness and accuracy of the final tabulations, then, are dependent entirely upon the thoroughness of the original plans made for obtaining the results, and the control exercised over those functions organized to carry out the plans.

Without fear of contradiction it may be said that the final tabulated inventory with the total figure is intended primarily for balance sheet and income statement purposes. These two financial statements rank second to none in importance, and all other conditions being equal, the profits and the present worth are as accurate and according to the facts as the inventory is correct.

It is not uncommon to find concerns making use of the final inventory results for financial purposes only. In fact it is unfortunate that so many fail to utilize to the fullest extent, for the purpose of aiding in the determination of future administrative policies and for conserving capital, the great amount of other valuable information to be derived from an inventory.

Tabulations for Future Administrative Policies.—In addition to its use for the financial statements, the inventory, through the preparation of special tabulations, offers a valuable means to the management of any concern for directing future purchasing, manufacturing, and sales policies. It is not enough that the

history of the past period be presented. In addition it is necessary that all information pertaining to the inventory be so arranged that by its use such courses of action may be taken as will assist in reducing the investment of capital in inventory, balancing stock for production purposes, preventing overpurchasing, disposing of non-current materials, and helping to solve the hundreds of other problems necessary to be solved if future operations are to be successfully directed.

It is intended that this chapter describe, among other things, the purpose and arrangement of the two following kinds of tabulations:

1. Standard.
2. Special.

Standard tabulations refer to those schedules of the complete inventory which are compiled primarily for financial uses,

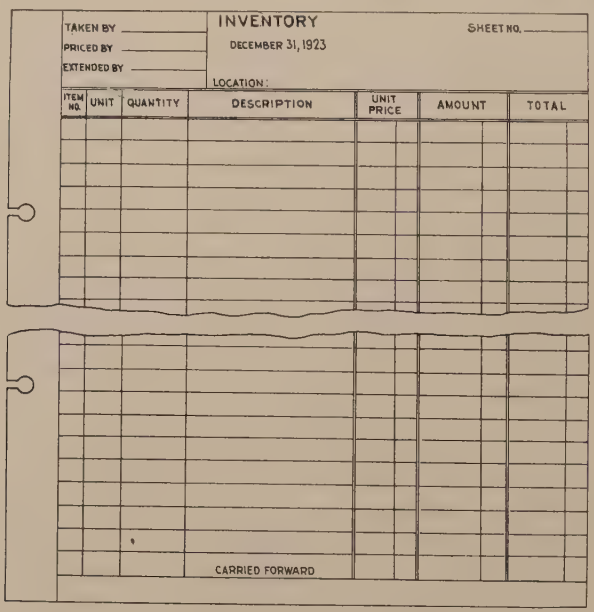


FIG. 23.—Simple inventory form.

although of additional value for other purposes providing the details are systematically and logically arranged.

Special tabulations refer either to those schedules of the complete inventory arranged in a particular form for obtaining

special results, or to those schedules compiled from but a portion of the entire inventory data.

Standard Inventory Schedules.—In arranging standard tabulations consideration should first be given to separating direct material from indirect material. Each of these two classes of material serves a different purpose, so it is advisable that they be shown under their respective classifications. Determining the subdivision of each class should be the next consideration. In this respect a great deal depends upon what arrangement will be most useful for the purposes for which it is intended. Direct material, for example, may be classified by models or products, by the status or condition of the material, by utility of the material, or in any combination of all three classifications. Indirect material on the other hand may be divided into operating and maintenance supplies, and consumable tools, with these classes in turn subdivided into those supplies applicable to special plant functions. Further details of these suggested classes or subdivisions are shown in the paragraphs which follow.

Direct Material Schedules.—The following are suggested for direct material subdivisions:

1. By locations.
2. By models or products.
3. By utility.
    - *a.* Current.
    - *b.* Obsolete.
    - *c.* Salvage.
4. By status.
    - *a.* Raw direct materials.
        - (1) Applicable to special models or products.
        - (2) Common to more than one model or product.
    - *b.* Rough castings, forgings, and stampings purchased.
    - *c.* Special semi-finished parts purchased.
    - *d.* Standard parts in process of manufacture.
    - *e.* Special parts in process of manufacture.
    - *f.* Standard parts purchased.
        - (1) Applicable to special models or products.
        - (2) Common to more than one model or product.
    - *g.* Standard parts manufactured—finished.
        - (1) Applicable to special models or product.
        - (2) Common to more than one model or product.
    - *h.* Special finished parts purchased.

i. Special parts manufactured—finished.
j. Special semi-finished assemblies purchased.
k. Special assemblies in process of manufacture.
l. Special finished assemblies purchased.
m. Special assemblies manufactured—finished.
n. Product or models in process of assembling.
o. Finished models or product.
p. Material in transit—inward.
q. Material in transit—outward.

From the list above it will be noticed that the classifications have been so arranged that material is grouped according to its

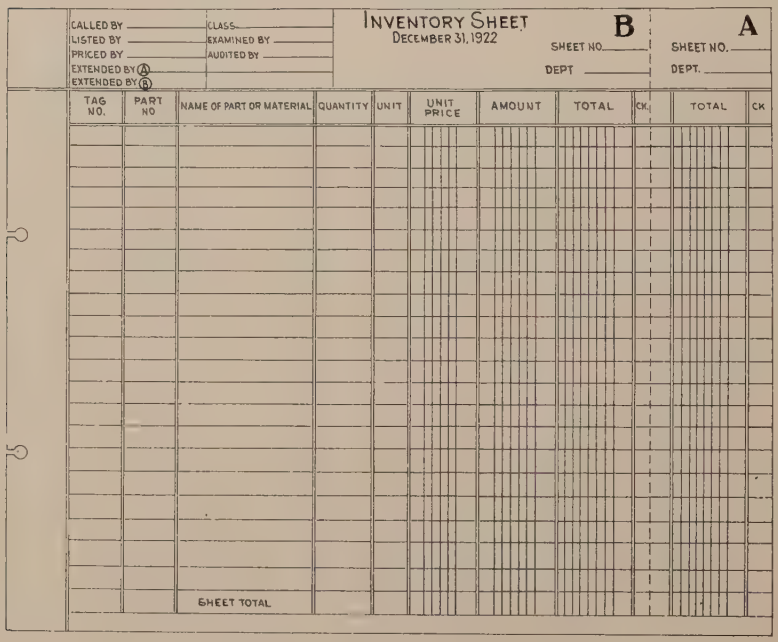


FIG. 24.—Inventory sheet.

physical condition, commencing with raw or rough material and ending with the finished product. It will also be observed that purchased material is scheduled separately from manufactured material. Not only is this necessary, especially from the standpoint of cost, but incidentally it calls sharply to attention those parts that are acquired from vendors at a price lower than their cost to manufacture.

Indirect Material Schedules.—Indirect materials may be advantageously classified under the following divisions:

1. Operating and maintenance supplies.
2. Consumable tools.
3. Machine and equipment repair parts.
4. Packing and shipping materials and supplies.
5. Scrap.

If deemed necessary, especially with respect to consumable tools and also operating and maintenance supplies, further division may be arranged under the captions of:

1. Current materials.
2. Obsolete materials.

Operating and maintenence supplies, consumable tools, packing and shipping supplies, and scrap should be listed in detail alphabetically by commodities. Machine and equipment repair parts may well be arranged alphabetically by manufacturer's name, with all parts applicable to each manufacturer listed numerically. In some instances where separate storerooms are maintained it is possible to arrange indirect materials in classes, the names of which accord with the users of the materials. For illustration:

1. Electricians' supplies.
2. Carpenters' supplies.
3. Plumbers' supplies.
4. Masons' supplies.
5. Millwrights' supplies.
6. Cleaners' supplies.
7. Painters' supplies.
8. Beltmakers' supplies.
9. Patternmakers' supplies.
10. Etc.

Where all, or practically all, indirect material is issued from one main storeroom it is quite a useless task to attempt classification according to the users. The same supplies, used by two or three divisions, may be in one bin or compartment. To apportion such items on an arbitrary basis would accomplish no good result. Of course all supplies special for only one class of work may be arranged under that special class, and those supplies common to several classes of work may be arranged

as such. Whatever arrangement is used it is necessary to decide first, if the information to be obtained is important enough to warrant the expense of obtaining it. If a less detailed classification will serve the purpose satisfactorily, a more detailed classification is a waste of time and money.

Standard Tabulation Summary.—When the details of the various subdivisions of the direct and indirect material respectively have been tabulated the total value of each subdivision should be determined. With these totals, the value of both the direct material, indirect material, and total inventory may be easily obtained.

The next step should be to arrange an inventory summary showing under direct material, each subdivision and the inventory value thereof, and a similar arrangement in the case of indirect material. If some of the subdivisions under either class of material are considered too detailed and of no particular value for summary purposes they should be consolidated with other subdivisions considered necessary for the summary. The inventory value of both the direct material and indirect material should be shown separately in addition to showing the total value of the entire inventory.

Special Inventory Schedules.—Special schedules are prepared for the purpose of obtaining special information required for intelligently directing future policies. They are schedules which reflect results or lack of results of courses of action which have taken place in the past. Whether all or only a portion of the entire inventory data is to be used for these special tabulations depends upon the nature of the information required.

The following is a fairly comprehensive list of special schedules compiled from inventory data:

Administrative and Financial:

1. Material by locations.
2. Intercompany material.

Production:

1. Work-in-process.
2. Spare or repair parts.
3. Material reserved for special orders.
4. Material applicable to experimental products.
5. Material on consignment for manufacturing.
6. Obsolete direct materials.
7. Obsolete indirect materials.

THE STANDARD CORPORATION

Inventory Summary

December 31, 1924

	Amount	Ratio Per Cent		
Raw Materials				
Model 10	$ 200,000	13.3		
Model 11	400,000	26.7		
Model 12	850,000	56.7		
Common	50,000	3.3		
	$1,500,000	100.0		
Rough or Unworked Parts				
Model 10	$ 100,000	8.0		
Model 11	625,000	50.2		
Model 12	500,000	40.1		
Common	20,000	1.7		
	$1,245,000	100.0		
Total Raw Materials and Unworked Parts			$2,745,000	37.2 %

Work-in-Process

	Parts	Assemblies	Product	Total	
Model 10	$ 105,000	$ 20,000	$ 40,000	$ 165,000	19.5
Model 11	135,000	35,000	85,000	255,000	30.1
Model 12	200,000	70,000	145,000	415,000	49.2
Common	10,000	.....	.....	10,000	1.2
	$ 450,000	$125,000	$ 270,000	$ 845,000	100.0
	53.2 %	14.8 %	32.0 %		
Total Work-in-process				845,000	11.4 %

Finished Materials

	Parts	Assemblies	Product	Total	
Model 10	$ 375,000	$105,000	$ 200,000	$ 680,000	18.9
Model 11	600,000	415,000	250,000	1,265,000	35.3
Model 12	500,000	350,000	750,000	1,600,000	44.7
Common	35,000	.....	.....	35,000	1.1
	$1,510,000	$870,000	$1,200,000	$3,580,000	100.0
	42.1 %	24.3 %	33.6 %		
Total Finished Materials				3,580,000	48.5 %

Indirect Materials			
Operating and Maintenance Supplies	$ 90,000		
Consumable Tools	85,000		
Machine and Equipment Repair Parts	22,500		
Packing and Shipping Supplies	12,500		
Total Indirect Materials		210,000	2.9 %
Total Inventory		$7,380,000	100.0 %

Sales:

1. Finished product on hand.
2. Finished product on consignment at dealers and distributors.
3. Finished product at exhibitions, fairs, etc.
4. Finished product at branch houses.
5. Spare parts.

Purchasing:

1. Obsolete raw materials on hand.
2. Obsolete indirect supplies on hand.
3. Rejected material for return to vendors.
4. Material on consignment at other firms for manufacturing.
5. Scrap.

Schedule of Material by Locations.—For purposes of insurance, corporation taxes, personal property taxes, state or Federal income taxes, foreign income taxes, depreciation of materials, and for determining possible excessive inventories at distributing points, a schedule should be prepared to show the quantity and value of materials at each location. The tabulation may be arranged by any one or any combination of the following:

1. Countries.
2. States.
3. Cities.
4. Plants.
5. Buildings.
6. Departments.
7. Storerooms.

In the case of insurance, arrangement by location should give such information as will permit the management to determine if the insurance carried is adequate; if unnecessary insurance is in force; if the material has the risk for which it is insured. On the other hand, taxes demand the value of inventories for determining not only the profits earned in each state or country where profit taxes are in force, but also for gaging the reasonableness of personal property taxes. Especially is it desirable to know the inventory at distributing points. A comparison of the cost of sales at each place over a fixed period with the inventory should determine the rate of turnover as a means for judging whether or not excessive quantities of materials are being carried. Either the inventory as a whole or particular products or spare parts may be excessive. A comparative tabu-

lation showing both the inventory of the past and the present period by individual products and parts will assist in balancing the inventory to agree with actual requirements.

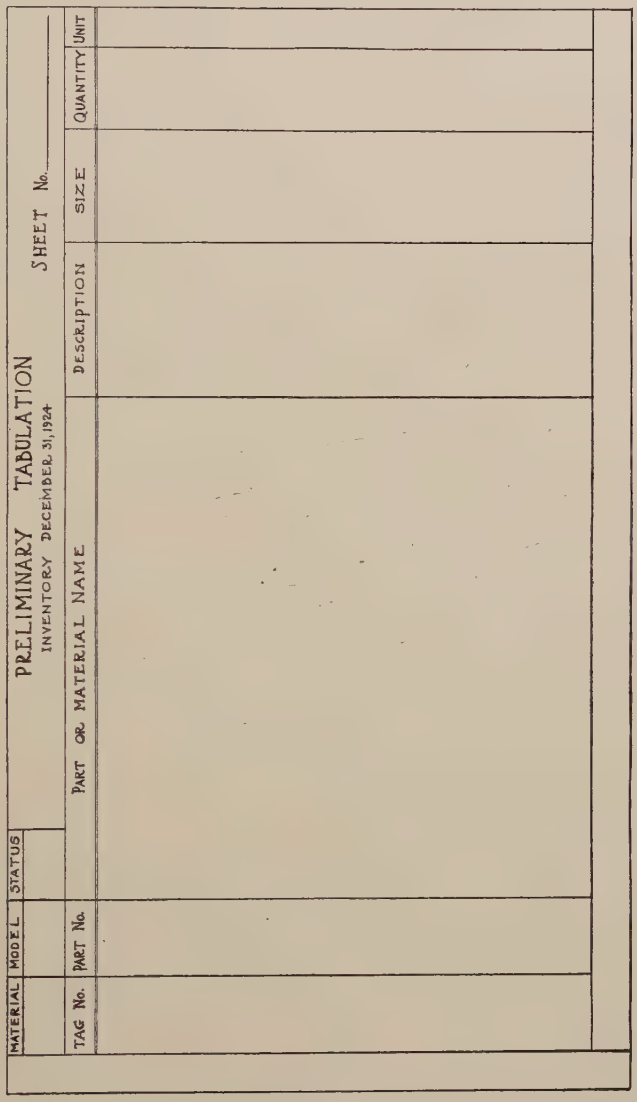


FIG. 25.—Preliminary tabulation sheet.

Schedule of Intercompany Material.—Where the inventory is applicable to a concern affiliated with one or more other concerns it is important that a separate schedule be prepared for

materials received from such affiliated concerns, on hand and unsold on the inventory date. Especially is this important if such material has been billed to the purchasing company at prices which are greater than the actual cost to the affiliated companies—in other words, where the billing price includes the element of profit.

In the instance of consolidated statements it is necessary to have all unrealized intercompany profits eliminated. Therefore, all intercompany profits in the inventory of materials and merchandise must be set up and deducted from the gross inventory figure. A schedule of intercompany material giving the following information will allow the above to be accomplished:

1. Description of material or merchandise.
2. Company received from.
3. Billing price per unit.
4. Intercompany profit per unit.
5. Actual cost per unit.
6. Quantity.
7. Amount—at billing price.
8. Amount—at actual cost.
9. Amount of intercompany profit.

The gross amount determined by the use of the billing prices of the affiliated companies is required in so far as the reconciliation of the gross inventory figure with the controlling account is concerned. For consolidated statement purposes the amount of intercompany profit in the inventory of one company must be deducted from the apparent profit of the affiliated company, and the net inventory figure (actual cost) used in consolidating this asset for consolidated balance sheet purposes.

Schedule of Work-in-process.—This schedule should be arranged to show under models or products the value and quantity of parts and assemblies still in process of manufacture on the date of the inventory. In addition to the name and number of the part or assembly and the quantity and value, this schedule should be prepared to give information pertaining to the following:

1. Location.
2. Machine or process where material is located.
3. Lot number.
4. Lot quantity.
5. Operations performed.
6. Last operation performed.

A tabulation with this information offers an invaluable means to the production department for adjusting their records to

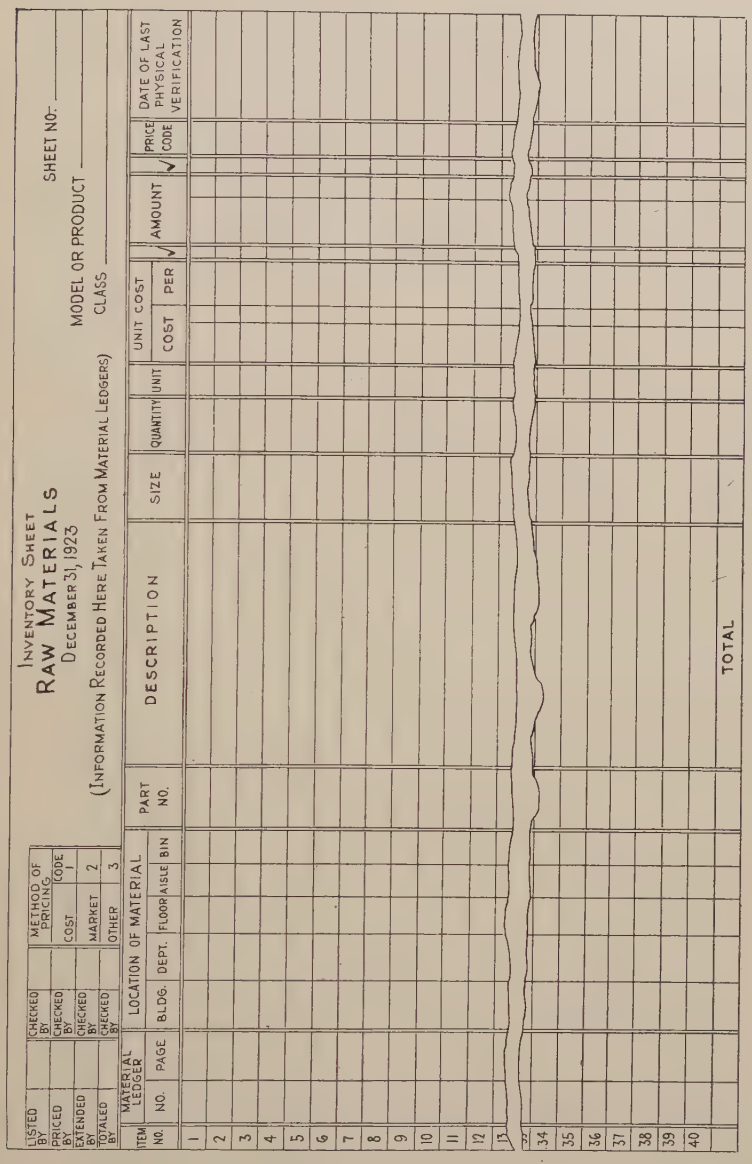


FIG. 26.—Inventory sheet—raw materials.

agree with actual conditions; discovering shortages in lot quantities caused by excessive spoilage and rejections; locating material

misdirected and sidetracked in dispatching; locating material at the wrong machine; discovering overproduction; and for calling attention to obsolete parts and assemblies in process. The inventory value of work-in-process for each model may be used to establish the percentage of each to all the work-in-process. *In addition, such values are needed for determining probable increases in the future inventories of finished parts or products.*

Schedule of Spare or Repair Parts.—All spare or repair parts and assemblies for the product should be tabulated numerically under their respective models or products. Further classifications may be arranged by showing the above information by each location where the material has been inventoried.

This schedule should first be used for determining the total value of spare parts. This value compared with the value of former spare part inventories will show the increase or decrease in investment in this class of material. In addition the present inventory value divided by the number of products still in use by customers, establishes the average investment in spares for each unit in use. This average investment, compared with the average cost of sales for spares during a fixed period for each unit of product in use furnishes a means for indicating an excessive inventory of spare parts.

The spare parts inventory may be overstocked with materials applicable either to current or obsolete models or products. If overstocked with current materials, the excess may be released for the assembly of current models; if overstocked with obsolete materials the excess may be disposed of by converting it if possible into parts applicable to current models or by sale as scrap.

From this schedule it is also possible to determine shortages of parts or assemblies. With this information at hand the production department can schedule such materials through the shop as will relieve the shortages thus helping to prevent complaints because of lack of service.

Schedule of Material Reserved for Special Orders.—Material reserved for special orders should be scheduled for the production department in order that it may determine the net amount of materials available for present and future production programs. Unless such a tabulation is prepared, that department may base its purchase requirements on the gross amount of materials shown on the tabulation of the entire inventory. The consequent result

will be material shortages, interference with production, and possible higher cost of material purchased to make up the shortages.

Material reserved for special orders should be arranged to show:

1. Name of company reserved for.
2. Description of work.
3. Model of product.
4. Status of material.
5. Part or material name.
6. Location in plant.
7. Quantity.
8. Unit.
9. Unit cost.
10. Total.

This tabulation should not be confused with any schedule which may be prepared from the material ledgers showing the apportionments for production lots made against various kinds of material.

Schedule of Material Applicable to Experimental Products.—A tabulation of materials reserved for experimental work on products should be prepared for the same reason that the preceding tabulation is prepared, *i.e.*, to enable the production department to determine the net amount of material available for present and future production programs. This schedule should give the following description:

1. Experimental product—name.
2. Status of material.
3. Part or material name.
4. Location in plant.
5. Quantity.
6. Unit.
7. Unit cost.
8. Total.

Schedule of Material on Consignment for Manufacture.—It is the practice of many firms to consign raw, rough or possibly semi-finished parts to other firms for the purpose of having such material manufactured into finished parts. Material of this kind, the ownership of which still remains with the consignor, cannot be tabulated from the inventory tags for the reason that

such material is not reported by means of inventory tags. Material of this nature should be identified prior to the inventory and tagged "Not to Be Inventoried." If required, a

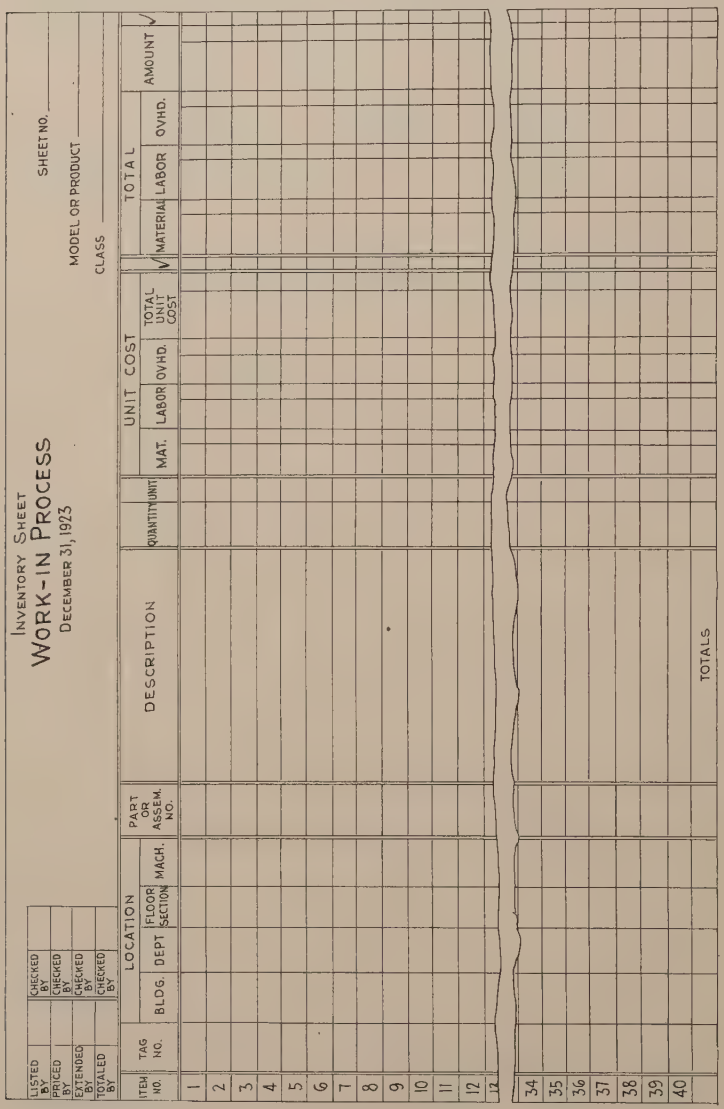


Fig. 27.—Inventory sheet—work-in-process.

schedule may be prepared from these tags for the use of the production department. Although the material should not be included in the inventory figure because title in the material rests

with the consignor yet labor and overhead expended on this material, on hand at the time of inventory, should be included in the total representing the value of the entire inventory, unless such labor and overhead has been taken out of the work-in-process inventory and charged to the cost of sales.

Schedule of Obsolete Direct Materials.—A schedule of obsolete direct material properly arranged and totaled for the production department should furnish:

1. The amount of this class of material.
2. A basis for determining the amount of increase or decrease since the last inventory.
3. A means for reducing the inventory: (*a*), by sale of such materials as can be used by other manufacturers (with special reference to raw materials); (*b*), by the conversion of this material into parts or assemblies of the present product; and (*c*), by disposition through scrapping.
4. The status, description, quantity, and value of obsolete material at each location. This is a means for consolidating or decreasing inventories for the purpose of reducing fixed charges applicable thereto.
5. A means for determining the amount of material rendered obsolete by changes in each of the various products or by the change in design or specifications of parts and assemblies.

Schedule of Finished Products.—A schedule of finished products should be furnished to the sales department as a means of informing them of the locations, quantities, and amount of all finished products. A schedule of this kind permits that department:

1. To ascertain the amount of finished product.
2. To compare the present inventory with inventories of past years, consideration being given to increased sales.
3. To compare present inventory with unfilled orders.
4. To balance inventories at various points of distribution.
5. To determine the location, quantity and amount of finished product on consignment at:
   - *a*. Dealers, distributors, or other agents or consignees.
   - *b*. Exhibitions, fairs, and permanent shows.
   - *c*. Experimental stations.
   - *d*. Branch houses.
   - *e*. Warehouses.

Schedule of Spare Parts.—In addition to the schedule of finished product the sales department should be furnished with a schedule of all spare parts as a means for gaging the adequacy

of the amount of this class of material for service purposes. Although the value of the present inventory of spare parts as a whole may indicate that the inventory is excessive, an analysis of practically every item is necessary before any reliable conclusion can be reached. Quantity should be given main consideration in determining if the inventory is excessive. Statistics of individual part consumption averaged over representative past periods, together with sales of products during the last period and possible increased sales during the coming period, are the best means for determining whether or not the investment in spares is too great. Use of the total value alone for deciding future policies is a dangerous one, especially if there has been a general increase in the unit cost of parts.

Arrangement of this schedule by locations affords a means for balancing stocks by withdrawing from those places having excesses of certain parts and shipping to those places reporting shortages.

Schedule of Obsolete Raw Materials.—This tabulation should be prepared for the purchasing department to aid in disposing by sale such obsolete raw material which cannot be used for current models or products, or which are not needed for spare parts of non-current models or products. Before any disposition of this material is made approval should be obtained from the production department.

The following information should be scheduled:

1. Name of material.
2. Complete description.
3. Size and length.
4. Condition.
5. Location.
6. Quantity.
7. Unit.
8. Unit cost.
9. Total.

Schedule of Obsolete Indirect Supplies.—All maintenance and operating supplies, consumable tools, and machine and equipment repair parts which are of no further use should be separately tabulated in detail and submitted to the purchasing department. This department after conference with the production department may use this schedule as a means for disposing by sale of all supplies, standard or special, which cannot be adapted for current production purposes. In order to allow sales

of this class of material to be made, complete description of each kind of material should be given in this schedule. The following information is required for each item:

1. Name of material.
2. Description.
3. Size.
4. Length.
5. Standard or special.
6. Condition.
7. Location.
8. Quantity.
9. Unit.
10. Unit cost.
11. Total.

Material of this class should not be disposed of until the purchasing department is satisfied that the future manufacture of non-current direct parts will not require it. Many times such material is sold without consideration being given to this matter. Subsequent manufacture demands these supplies, with the result that they have to be purchased at excessive costs due to expensive set-up charges, special tools, etc.

Schedule of Rejected Material for Return to Vendor.—A schedule of this material affords the purchasing department a means of obtaining credits from vendors or replacements for material found defective during manufacture. In many plants material control is so unsatisfactory that this class of material does not come to the attention of the purchasing department until an inventory has been taken or until material shortages occur. All rejected material on hand at the time of the inventory, therefore, should be tabulated and used to obtain credits, to effect disposition of this material, or to secure replacement material from the vendor. This schedule should show:

1. Part number.
2. Part or material name.
3. Vendor's name.
4. Vendor's address.
5. Description and size of material.
6. Reason for rejection.
7. Quantity.
8. Unit.
9. Unit cost.
10. Total.

In charging back rejected material to vendors, these matters should be considered:

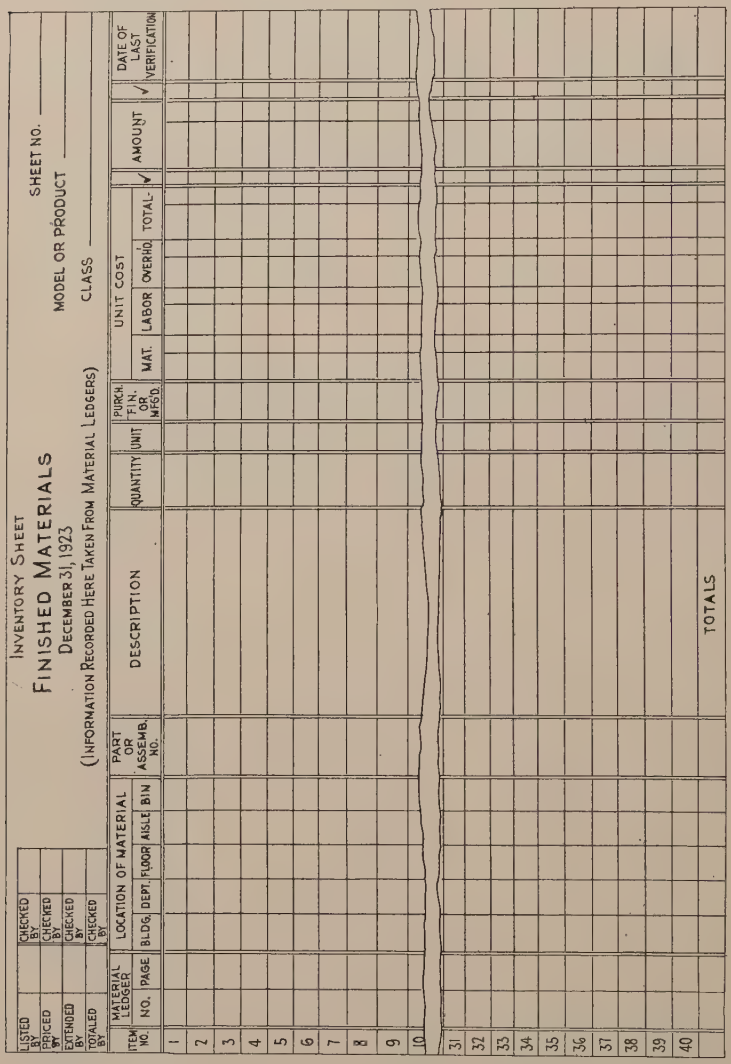


Fig. 28.—Inventory sheet—finished materials.

1. Transportation and handling charges applicable to the original shipment, paid by the company.

2. Transportation and handling charges applicable to the return of the rejected material to the vendor.

3. Material purchased by weight. This refers to material purchased at a weight greater than the weight of the material returned, due to loss of weight through machining.
4. Credit for the amount of labor expended on defective material.

Schedule of Material on Consignment at Other Firms for Manufacture.—It is not unusual for concerns to consign rough or raw material to other concerns for the manufacture of parts or assemblies. All such material on consignment on the date of inventory should be included in the final inventory tabulation.

The usual way of obtaining confirmation of this material from the consignee is by means of correspondence. Each consignee should be requested to furnish as of the inventory date the description and quantity of material in their possession. By means of statements, schedules, or other documents submitted by them, a tabulation can then be prepared. It should be arranged with the following data:

1. Name or part number of raw or rough material.
2. Shipping order number.
3. Parts or assemblies to be manufactured.
4. Name of consignee.
5. Address of consignee.
6. Quantity already returned completed.
7. Present status of material on hand.
8. Quantity at each operation.
9. Unit.
10. Unit cost.
11. Total.

Care should be taken to include only the cost of material unless the labor, overhead, and profit have been billed by the consignee and entered in the book inventory.

A tabulation of material on consignment at other firms for manufacture allows the purchasing department to learn of the exact status of the work and to determine if an excessive amount of material is being spoiled. In addition it also allows that department to check their records of material received with the quantities which the consignees report as already delivered.

Schedule of Scrap.—A tabulation of scrap should be furnished to the purchasing department to show the kind and quantity of all scrap on hand on the date of the inventory. This schedule should assist that department in disposing of it, providing the quantities thereof are large enough to bring the best prices.

Before obtaining any competitive bids for its sale the purchasing department should eliminate from the list all scrap

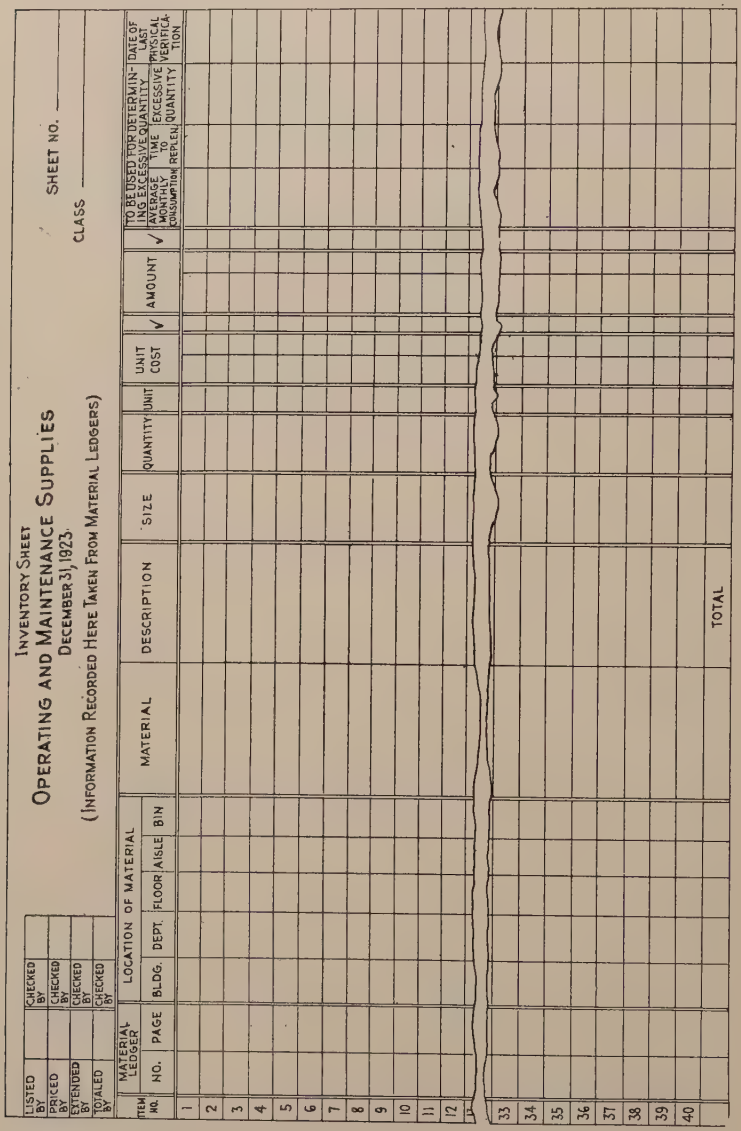


Fig. 29.—Inventory sheet—operating and maintenance supplies.

which can be used by the company itself. The balance may then be sold if conditions and prices are considered favorable.

Reducing the Investment in Inventories.—In the final analysis special schedules or tabulations are intended as a means for assisting the management in reducing the investment in inventories. Because of present-day quantity production methods, the vast quantities of material required have necessarily increased the capital invested in inventories to such an extent that in a large proportion of the manufacturing concerns the inventory is the second largest asset on the balance sheet.

Because of the many ramifications which surround the physical material, it is a difficult thing to control properly. As a result when an actual inventory is taken the management should not hesitate to grasp the opportunity of obtaining such detailed and special tabulations as will allow then to clear their decks for the next operating period and to outline a program for reducing the inventory investment in the future. Reducing the inventory not only releases working capital for other uses but decreases fixed expenses of the following nature:

1. Interest.
2. Depreciation of material through deterioration and obsolescence.
3. Expense of maintenance of stock.
4. Expense of protection of stock.
5. Storage expenses.
6. Insurance.
7. Handling.
8. Taxes.

The above schedules discussed are by no means an exhaustive list. Individual analysis on the part of any firm should result in securing other schedules of equal or possibly more value to it.

Tabulating Suggestions.—The following suggestions if carried out will help materially in bringing about a more satisfactory inventory:

1. Inventory sheets should be prepared in loose-leaf form. This makes for ease in subdividing the work. Later all sheets can be bound in a permanent binding.
2. Only one side of the inventory sheet should be written on.
3. Each sheet should be numbered.
4. Different colored sheets for material classification purposes should be used. For example: white sheets for raw materials; blue for work-in-process; etc.
5. Each sheet should show its individual total. This is to be preferred to the method of carrying the total forward from one sheet

to the next succeeding sheet. It is easier to correct such mistakes as arise, and errors will not accumulate.

6. The total of each sheet should be summarized on a summary sheet.

7. There should be a separate summary sheet for each class of material.

8. All summary sheets should be summarized on one master summary sheet.

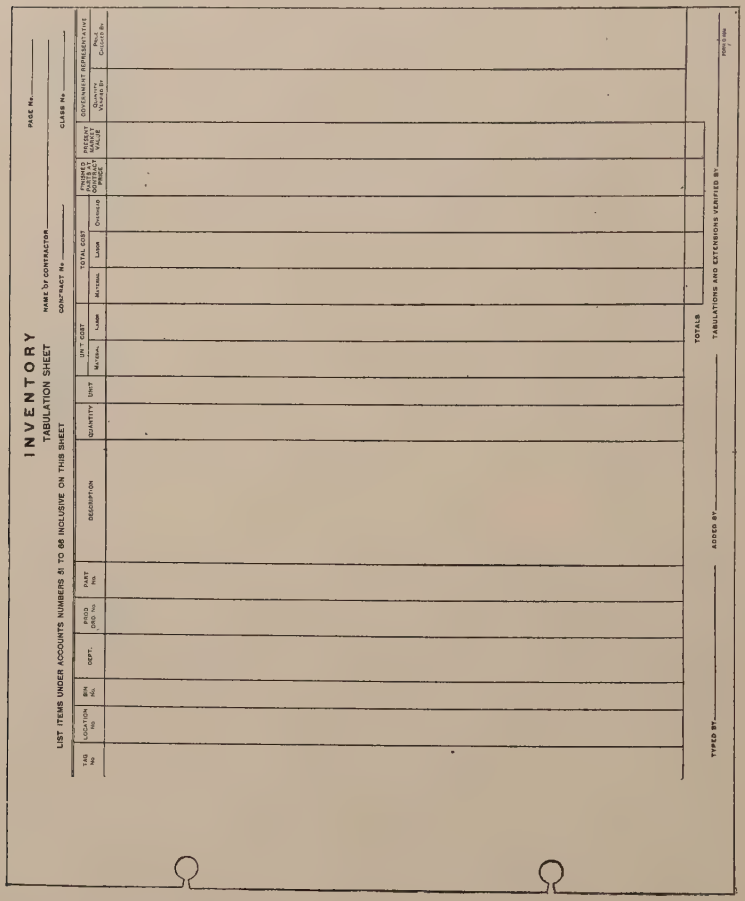


Fig. 30.—Inventory tabulation sheet.

Arrangement for Material Ledger and Controlling Accounts Adjustments.—Although in most instances it will be found practically impossible to arrange the detailed inventory data on the inventory sheets so that the order of arrangement will

exactly coincide with the arrangement of the accounts for the same materials in the material ledgers, it is possible within a certain degree to do so. Therefore in deciding what arrangement the inventory information should take, due consideration should be given to the fact that the material ledgers must be brought into agreement with the physical count, and such work can be greatly facilitated by a little judicious planning of the final inventory arrangement of details.

Since the various inventory summaries follow the inventory details it is necessary that the inventory tabulation be arranged so that totals can readily be obtained for adjusting the respective material control accounts in the general ledger or factory ledger.

Application of Tabulating Equipment to the Inventory.—The greater part of inventory clerical work is repetitive and as a result may be accomplished more quickly, more accurately, and less expensively by machines. The following paragraphs describe briefly how the pricing and final tabulation of the inventory may be facilitated by means of tabulating machines used in conjunction with perforated cards.

Equipment.—Tabulating equipment such as Powers accounting machines consists of three units: a punching machine for perforating cards; a sorting machine which automatically sorts the cards by proper selection of the perforations; a tabulating machine which automatically tabulates and totals on summary sheets the details represented on the cards by the perforations. In subsequent paragraphs these machines will be referred to as the punching machine, the sorter, and the tabulator, respectively.

Inventory Tag.—If it is planned to make use of these machines on the inventory, careful consideration should be given, first to the type of cards to be used for tabulating, and second to the data required for the various detailed summaries. As in the case of other forms, the tabulating card should contain all essential data which will be required for the final reports. Two methods may be used in applying tabulating cards to the inventory:

1. *The Dual Card.*—This card is used for two purposes—as an inventory tag and as a tabulating card for punching, sorting and tabulating.
2. *The Single Card.*—In this case the ordinary inventory tag is used until the final reports are to be tabulated. At that time the informa-

tion on the inventory tag is transcribed to the tabulating cards and the tabulating cards then used for compiling the final reports.

In the first case it must be understood that the tabulating card is used in exactly the same manner as an inventory tag. It is issued from the clearing house by the custodian, filled in by the

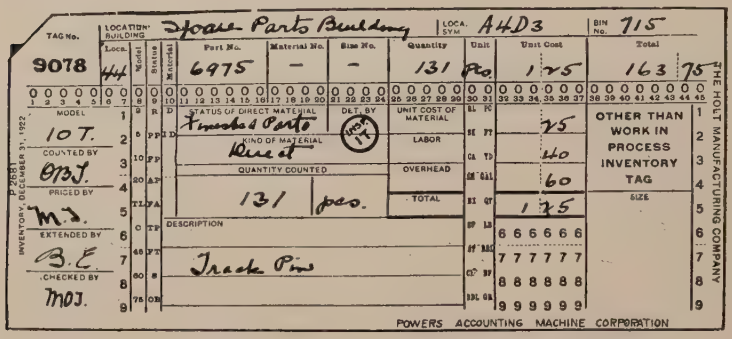


FIG. 31.—Dual tabulating card—other than work-in-process.

tag writers, checked by the checkers, and subjected to other verifications in the same manner as any other inventory tag. However, when it reaches the tabulating division the same card

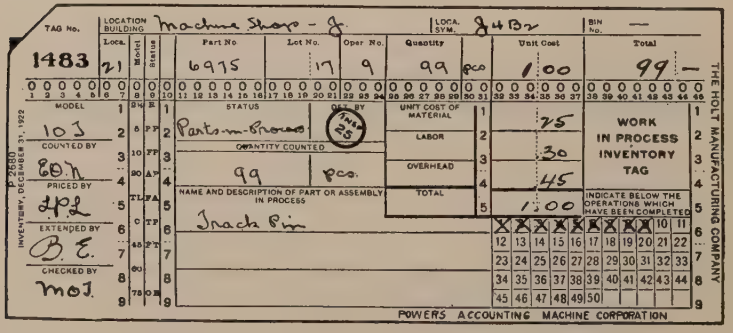


FIG. 32.—Dual tabulating card—work-in-process.

is perforated by the punching machine and then used for pricing and tabulating.

In the second case the tabulating card does not leave the tabulating division. The regular inventory tag is used in the same manner as though no tabulating equipment were available.

However, when these inventory tags have been priced and extended they are then sent to the tabulating division where the information recorded on them is transcribed to tabulating cards by means of the perforations made by the punching machine.

The first method if properly controlled cannot be surpassed for expediting pricing and tabulating. Not only does it allow the above operations to be performed more rapidly but it produces many other advantages described here briefly. To operate a method of this kind requires very careful supervision or else the cards will be returned from the factory departments and storeroom in such shape that they cannot be used in the tabu-

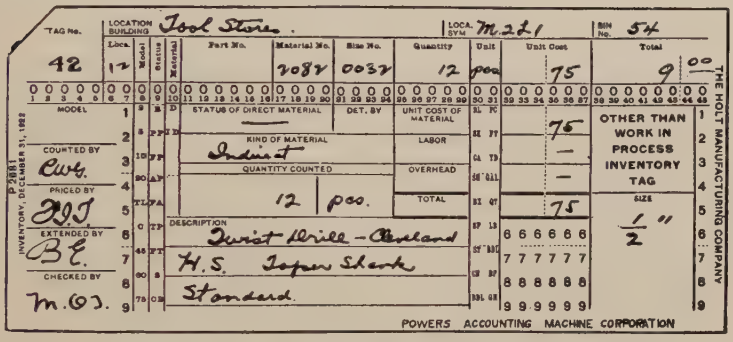


FIG. 33.—Dual tabulating card—indirect material.

lating machines. Unless each member of the organization has been instructed to handle such cards carefully and without damaging them, it may be expected that many cards will reach the tabulating division either bent or torn or otherwise mutilated. The dual card has been used to excellent advantage by many of the larger industrial concerns who have been able to impress upon their employees the necessity for returning the tabulating cards in the same condition as when issued. Where this method is used a small tag bearing the same number as the tabulating card is attached to the material and identifies it as having been inventoried. The tabulating card with the full description of the material thereon is then returned to the clearing house and proceeds through the various operations of check and verification.

A large number of firms equipped with tabulating machines have been unwilling to accept the dual card method. Possibly

because of past unfortunate experiences they are not willing to take what they may consider an unnecessary risk. Many of these past experiences of an unfavorable nature may be traced back to the failure to properly instruct employees in the use of the cards. If, before the inventory commences, all members of the inventory organization understand the functions of the machines, and are shown the results occasioned by damaged or mutilated cards, they will naturally take more interest in the matter than if they lack an understanding of the results that will be caused by improper handling.

It is intended in the following paragraphs to describe the use of the *dual* card as a means of expediting pricing and tabulating.

Pricing.—When the dual cards containing all inventory information have been returned from the factory and have successfully passed through the hands of the custodian, checkers, and coders, they do not go directly forward to the pricing division. Instead they are sent to the tabulating division. This division first punches all information up to, *but not including, price and the extension.*

Before any cards are actually priced, the tabulating division by means of its sorter then groups together all cards reporting the same part or material number. If, for example, part 2100 is inventoried in 10 different places in the factory, it will be reported on 10 cards. Sorting will bring together these 10 cards with the result that in pricing, the price card will need to be referred to but once. It may be necessary to arrange all part numbers under separate models. It may be necessary to arrange parts by their status, *i.e.*, raw, in-process, finished, obsolete, etc. It may be necessary to segregate all raw material of the same kind, grouping together, likewise all reamers, cutters, files, etc. Whatever is required may be easily accomplished by the sorting machine which brings together all inventory tags bearing either the same part number or the same material number.

When the cards have been sorted by part number or material number they are then forwarded to the pricing division. This division's work is made easier because similar materials and parts have been grouped together. In pricing part 2100 as mentioned above, the 10 cards reporting the inventory of this part will be found grouped together and priced at one time. In a similar way cards inventoring other parts are sorted together and pricing these is also facilitated.

In the case of materials bearing no part number it will be found by the pricing division that the tabulating division has sorted similar kinds of material together by size or shape, whichever may be required. Also in the case of indirect materials it will be found that all cards reporting drills are grouped together by size; likewise, reamers, cutters, etc. Where cards are not sorted in the manner described above before reaching the pricing division, the pricer must refer to his price card as many times as there are cards for the same article in the inventory. By sorting the cards first, pricing is accomplished more rapidly and accurately. Although it is possible to sort the cards by hand such a method can hardly compete with machine sorting, which classifies at a rate of 18,000 to 20,000 cards an hour.

In pricing and extending, the pricing division should take special pains to keep the cards in the same order as received from the tabulating division.

Tabulating.—The first operation to be performed by the tabulating division upon the return of the cards from the pricing division is to punch out the unit price and extension. When this is completed, and before the cards are used for final schedules, preliminary tabulations are made on the tabulator and the cards checked in detail with these tabulations. Those cards which have been found to be inaccurately punched should be stamped "Wrong Punching" and a new tag (written in green ink) should take its place. The original tag, however, should be preserved as a part of the final records and when final filing is done this tag should be attached to the one which has taken its place for machine tabulation.

When all dual cards have been checked they are then ready for such sorting as is necessary for the various schedules required by the management. If a schedule of parts-in-process is required by the production department, all cards applicable to the inventory of such parts should be arranged by the sorter numerically under model, and then tabulated. If a schedule of obsolete parts is required, cards reporting this kind of material should likewise be sorted by models and part number, and tabulated. If a schedule of indirect materials is required by the production department all cards reporting indirect materials should be sorted by material code numbers. These numbers automatically arrange this kind of material alphabetically.

One of the unique features of the tabulator is the detailed listing accomplished in addition to the automatic accumulation of totals. It is possible with these machines to obtain the total not only of each page, but the total of each kind of material, whether the total desired is of quantity or value, or both. The final schedules may be tabulated on specially designed forms with distinctive headings thus eliminating the necessity of typewriting the final inventory schedules and summaries.

Benefits Derived from Tabulating Machines.—The advantages of using tabulating machines on an inventory may be briefly summarized as follows:

1. Cards are mechanically arranged and segregated for rapid pricing.
2. All schedules, whether standard or special, may be obtained quickly and at a minimum of expense.
3. Typewriting the final inventory is eliminated.
4. Inventory cards may be sorted in any manner for permanent filing.
5. Special information may be obtained quickly and with very small expense at a later time.
6. Scheduling may be accomplished more quickly and in greater detail than by any other means.
7. Schedules may be tabulated so rapidly that they can be used for administration purposes very shortly after the inventory count is completed.

On a recent inventory 40,000 dual inventory cards were used. The entire inventory, tabulated from these cards on to 700 inventory summary sheets, was finished in two days. Two tabulators and one operator only were used. During the same inventory the production department was furnished with a detailed tabulated report of all work-in-process, one day after the inventory count was finished. This report did not show the pricing nor extensions as these were not required, but did give the following information with respect to every part and assembly-in-process:

1. Part number.
2. Lot number.
3. Quantity.
4. Location.
5. Machine located at.
6. Operations completed.
7. Last operation.

With this report available the production department was enabled to verify the accuracy of its work-in-process and adjust its schedules and routing before manufacturing operations commenced.

Other than the savings in time and expense effected by its use, the principal advantage of tabulating equipment is the means which it affords of preparing inventory schedules so rapidly and in such detail that they are of real value for administrative purposes.

CHAPTER X

BRANCH HOUSE INVENTORIES

In most respects those matters associated with the taking of a branch house inventory are identical with those of any other inventory. In several important details, however, the branch house inventory requires distinctive treatment. In this chapter it is purposed to take up and discuss those special details which, if improperly dealt with, will cause unreliable inventory figures.

Like any other inventory there are many usual and unusual ways in which a branch house inventory may be used. The principal uses for the branch inventory are, however, three:

1. For the balance sheet and the income statement.
2. For check upon the custodian of the material.
3. For material control.

It is with respect to these uses that the following matters, peculiar to branch inventories, are concerned:

1. Goods or materials are consigned from the main plant to the branch house, and all charges and credits are generally on the basis of selling prices—not cost prices.
2. On the date of the inventory, goods are usually in transit either between the branch office and the main plant or between one branch office and another.
3. Stock records of the branch office and the main plant must be brought into agreement.
4. The controlling account in the main plant ledger must be adjusted.

Consigned Goods—Charges and Credits.—It is the practice for most plants to consign merchandise and materials to branch houses and to charge and credit them on the basis of selling prices, not cost prices. The amount of goods, in dollars, for which a branch house is accountable at any time is the difference between the total charges and the total credits, all elements making up both factors taken *at selling prices*. The following charges and credits are necessary in establishing the amount of material accountability:

Main Plant Charges Branch House:

1. With the adjusted opening inventory.
2. With all consigned material on invoices up to but not including the date the inventory commences at the branch office—except that to this figure should be added such material, shipped out from the main plant prior to the commencement of the inventory at the branch house, billed subsequent to that date.
3. With all material shipped from other branch houses to the branch house in question, up to, but not including the date the inventory commenced.
4. With all materials and supplies purchased in emergencies by the branch house from outside vendors.
5. With all returns from customers, provided the material is good and is salable.
6. With all increases in prices applicable to material in stock on the day the new prices go into effect.

Main Plant Credits Branch House:

1. With all sales by the branch house from consigned stock, up to, but not including the date the inventory commences at the branch house.
2. With all material returned to main plant by branch house prior to the inventory.
3. With all material transferred to other branch houses prior to the inventory.
4. With all decreases in prices applicable to material in stock on the day the new prices go into effect.
5. With all free replacement materials given to customers by branch house to make good, material previously sold which is later discovered defective or unusable.

To afford proper accounting, both at the main plant and the branch house, copies of all documents should be available. If branch house sales are billed from the branch house, copies should be sent to the main plant. On the other hand, if the billing is done at the main plant, it in turn should send copies to the branch from which the sales were made. The branch and main office should in no case fail to have their respective copies of consignment invoices, sales invoices, transfer credit and debit memorandums, customers' credit and debit memorandums, etc., if proper accounting control is to be exercised.

In reconciling the amount of material for which the main office holds the branch house accountable, with the amount which the branch itself may show, consideration should be given to instances where the billing dates and the shipment dates

do not coincide. This is important when material is shipped from the branch on the day prior to the inventory date, but not billed until the following, or perhaps a later date. Under such circumstances the branch house would not be given credit for the shipment in the proper period and accordingly would be held accountable for an amount of inventory too great by the amount of such delayed billings. It will also save time in reconciling and checking if the person in charge of the inventory will see to it that goods shipped from a branch house prior to the inventory date have their billing dated prior to the inventory date.

Material in Transit on Date of Inventory.—It is quite usual for materials which have been shipped from the main plant to the branch house prior to the inventory date, to be in transit at the commencement of, and during the inventory taking. When such is the case it is necessary that a careful record be made of such shipments in order that reconciliation between the main office book inventory and the branch office physical inventory may be readily accomplished. The physical inventory at a branch office, among other things, is a means for determining if the stock on hand is in agreement with the amount which the general books are holding the branch accountable for, and the physical inventory will naturally be short if goods in transit at the time of inventory (which by the way are charged to the branch at the time they are shipped and billed) are not added to the amount as actually inventoried at the branch office.

A form which has been found quite satisfactory for determining the amount of goods in transit is shown on the next page. This form is used in the following manner:

1. Section *A*, which supplies information concerning material received just prior to the inventory date, is filled in on the day the inventory commences. The information required is self-explanatory.

2. When the actual counting of materials on hand has been finished Section *B* is filled in. This section gives information pertaining to such shipments of materials which were received *during* the inventory. These shipments should not be unpacked nor put into stock until *after* the inventory has been completed.

3. When Sections *A* and *B* have been completed the form should be sent to the main office where the information called for in Section *C* is supplied. From the information given in Section *A*, *B* and *C* it is now possible to determine what shipments were in transit at the date of inventory.

4. With the invoice numbers of the shipments that were in transit available, it is possible to obtain the amount of each billing and complete Section *D*. The total of goods in transit should be added to the amount of goods actually counted at the branch office.

BRANCH HOUSE INVENTORY
SCHEDULE OF CONSIGNMENTS
BRANCH AT Chicago, Ill.

SHEET NO. 1
DATE 1/5/24

THIS PART OF FORM TO BE FILLED IN ON THE FIRST DAY OF THE INVENTORY

SECTION A
INFORMATION CONCERNING MATERIAL RECEIVED BY BRANCH HOUSE ONE (1) WEEK BEFORE INVENTORY DATE

INVOICE NO.	INVOICE DATE	DATE RECEIVED	RECEIVED FROM
7145	12/21/23	12/26/23	Rockford, Ill
7194	12/22/23	12/28/23	" " "
7289	12/27/23	12/31/23	" " "

THIS PART OF FORM TO BE FILLED IN WHEN PHYSICAL INVENTORY IS COMPLETED.

SECTION B
INFORMATION CONCERNING MATERIAL RECEIVED DURING THE INVENTORY

INVOICE NO.	INVOICE DATE	DATE RECEIVED	RECEIVED FROM
7301	12/28/23	1/3/24	Rockford, Ill
7340	12/29/23	1/4/24	" "

THIS PART OF FORM TO BE FILLED IN BY MAIN OFFICE AFTER COMPLETION OF THE INVENTORY.

SECTION C
INFORMATION CONCERNING MATERIAL SHIPPED FROM MAIN PLANT TO B.H. TWO WEEKS BEFORE INVENTORY DATE

INVOICE NO.	DATE	INVOICE NO.	DATE	INVOICE NO.	DATE	INVOICE NO.	DATE
7085	12/20/23	✓7379	12/30/23				
7145	12/21/23						
7194	12/22/23						
7289	12/27/23						
✓7301	12/28/23						
✓7340	12/29/23						

THIS PART OF FORM TO BE FILLED IN UPON COMPLETION OF SECTIONS A, B AND C

SECTION D
MATERIAL CHARGED TO B.H. IN TRANSIT ON DATE OF INVENTORY, TO BE ADDED TO THE B.H. PHYSICAL INVENTORY AMOUNT

INVOICE NO.	INVOICE DATE		AMOUNT	
7301	12/28/23	Rec'd during Inventory	$ 241	71
7340	12/29/23	" " "	375	82
7379	12/30/23	" after Inventory	501	12
		TOTAL	$ 1,118	65

FIG. 34.—Schedule of consignments—branch house inventory.

The term of two weeks as given in Section *C* may or may not be sufficient time. This is a matter which can only be determined after the method of transportation and the usual length of time in transit from the main plant to the branch office is known.

Inventory Tags.—All inventory tickets for branch inventories should be printed at the main office. These tickets should be standardized as to size, information, and use.

Sometime prior to the date set for an inventory a sufficient quantity of these tickets (the number usually determined from the experiences of past inventories) should be shipped to the

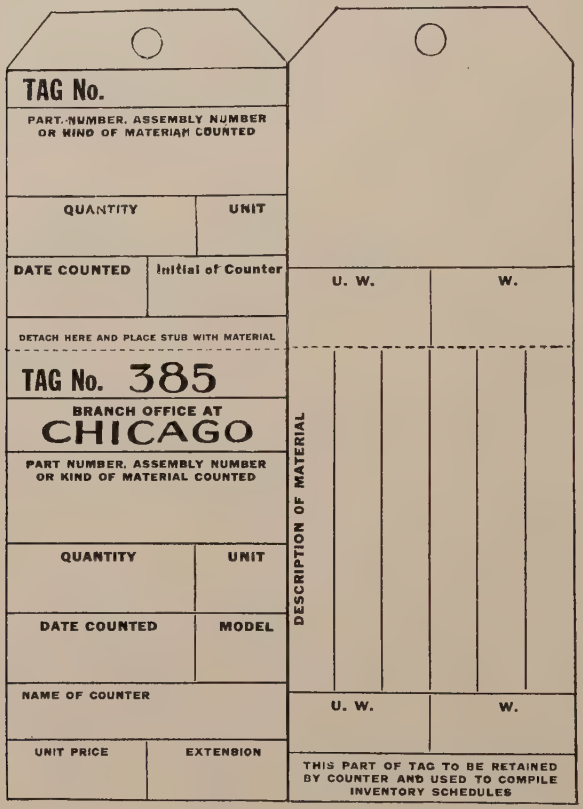


Fig. 35.—Inventory tag—branch inventory.

branch office *in care of the inventory auditor.* Each tag should be serially numbered. The first and last number of each shipment of tickets should be recorded at the main office for future checking purposes when the tickets are subsequently returned. The inventory auditor should be charged with the responsibility of accounting for all tags. A form of inventory ticket which has been found quite satisfactory is shown here. It will be seen that there are two parts to this tag: the upper section,

which is attached to the material as it is counted; and the lower section which is retained by the counter, used for checking the branch office stock records, and later employed for compiling inventory data and summaries at the main office.

Inventory Preparations.—Under ordinary circumstances the direction of the branch office inventory may be placed in the hands of the manager of the branch. Under special circumstances, on the other hand, where for example the manager's commissions are dependent upon the net profits of his branch, it is best that the direction of the inventory be placed in the hands of a special inventory auditor sent out from the main office. This representative of the main office should work with the representative of the branch manager, usually the storekeeper. Such an arrangement produces better results, especially if the inventory auditor has had previous branch house inventory experience.

In many cases the number of branches may be so great as to preclude any attempt at such an arrangement, and especially if all the branch inventories are to be taken on the same date. This difficulty has been overcome by having the inventories taken at sundry dates near the close of the year, and then bringing each branch inventory to its amount on December 31 by use of all documents which evidence the receipt into, or the issue from, stock—from the *actual* inventory date to the end of the year. The inventory auditor with his past experiences to draw on, will produce a more correct inventory as to quantity, classification, and valuation than a storekeeper who participates in but one or two inventories a year and has only written instructions to guide him. But no matter under whose direction the inventory is to fall, it is quite essential that the following instructions be carried out *prior to the date set for counting stock:*

1. Inventory tags should be arranged in their correct numerical order and inspected for possible duplication of tag numbers and for missing tags.

2. All material received *prior* to inventory date should be unpacked and put in stock, but no material received once the counting has commenced, should be put in stock until the inventory has been complete.

3. All invoices for materials placed in stock before inventory should be entered on the stock cards.

4. All material packed for shipment to customers should be shipped before inventory date, and entries made on the stock cards from the sales invoices.

Taking Inventory.—The process of counting should be performed in an orderly fashion. It should start at a designated point and proceed in such a systematic manner through the storeroom that no chance is presented for failing to count each item of every kind of material.

The count of each kind of material should be carefully performed, the article given its proper title and description, and this information entered on the inventory tag. One tag only for each kind of article or material is the rule. Two or more different articles should never be reported on one tag.

Usually the tag has two sections. The upper section is filled in first; then the lower section. When the two sections have been filled in the counter should tear off the lower section and attach the upper section to the material as evidence that it has been counted. The lower section of each tag is then placed in numerical order by the counter and retained by him.

Under ordinary circumstance the branch house inventory should proceed to its completion without other than the usual questions which necessarily associate themselves with the product being inventoried. These questions are of a local nature and usually present no difficulties. There is one important matter, though, which because it may apply as well in one case as another deserves consideration at this point. This concerns the shipping of material on customers' orders *during inventory taking.*

It will be recalled that one of the principal rules of inventory is the one which states that: "No movement of material should be permitted during the process of counting." This rule is for the purpose of preventing, in so far as possible, any duplications or omissions of material in the inventory, and it should be strictly enforced in every case except those of a special nature. But even in these special cases safeguards must be set up to prevent over- or understating the inventory. The shipment of material to customers is usually one of these exceptional cases, usually conditional upon two things: the length of time to take inventory, and the degree of urgency for the material by the customer. It is poor business to cause a customer unnecessary hardships by holding up the shipment of essential parts, etc. The material should be shipped, but some method devised to prevent errors in the inventory count.

A method used by a prominent manufacturing concern in the matter of handling the inventory of shipments made to customers during the inventory period follows:

Shipments during Inventory.—If a customer's order must be filled and shipped during the period of inventory the one in charge of the inventory must first determine if the material called for on the order has already been counted. This fact can be determined by noting if the upper part of an inventory tag is attached to the material or bin, or compartment, etc. If the material has been inventoried then it may be withdrawn from stock, packed, and shipped.

If it has not been counted, it must be inventoried at once, a tag written therefor, and the material then withdrawn and shipped.

As few shipments to customers as possible should be made during inventory. Hence if an order is not urgent it is advisable to hold it open until all counting has been completed.

Materials arriving from the main plant during inventory should not be unpacked nor put in stock until the entire work of counting has been completed. Such material if properly chargeable to the branch office should be taken into the inventory by means of the record shown above—Schedule of Consignments (Fig. 34). In some instances, it may be necessary to check physically such material in transit with the invoices before accepting the invoice quantity and amount as a part of the inventory. In most instances this operation is hardly necessary. Should it be so desired by the branch manager the check must wait until the inventory count is completed.

At the conclusion of the count a survey should be made to see that all material has been inventoried and tagged. This survey should be carefully performed in order that nothing may be omitted from the inventory. Surveys in most cases will be found to well repay the time required to accomplish them properly.

Adjusting and Reconciling Branch House Stock Records—Quantity.—Let it now be assumed that up to this point all material has been counted and tagged. The tags, *i.e.*, the lower sections of the original tags, should now be arranged in numerical order, and any tags which are discovered missing should be traced back to the stubs attached to the material. When all are properly accounted for, they should next be arranged in the same order in which the stock records are kept, by part numbers, material numbers, etc. This completed, the operation of comparing the inventory tags with the stock records and adjusting the stock records is next to be accomplished. This work should

be performed jointly by the representative of the main office and of the branch house.

The purpose of comparing the inventory tag quantity with the stock record quantity is to determine if the latter is in agreement with the physical quantity on hand. While the fact that these two amounts agree may give a certain amount of satisfaction it must be remembered that one purpose of such an inventory is to determine material accountability. This requires that the balance on hand at any time be the difference between the materials received and those properly issued and accounted for. Thus it may be that although the inventory tag quantity is in agreement with the stock record quantity, both figures may be at variance with the quantity that *should be* on hand. Control records for the purpose of telling what quantity *should be on hand* may or may not be kept at the main office. In a great many instances such records are kept, and it will be assumed that such is the case in the following discussion.

It is necessary for the main office to transmit to the inventory auditor just as soon as possible after the inventory date, a list of balances of each material taken from the control records. This list should include in addition to the quantity balance, the unit price, and amount. With such a list available the inventory auditor can then proceed to:

1. Compare each inventory tag quantity with the branch house stock record quantity.
2. Compare each inventory tag quantity with the main office control quantity.

If the three quantities agree a record of the physical inventory should be made on the stock record. This can be accomplished by using a rubber stamp of the following design:

	Date	Inv. Aud.	B. H. Rep.	Quantity
INVENTORY		Signed	Signed	

The inventory date and quantity is written in in ink and the inventory auditor and the branch house representative sign their initials.

Exactly what is to be done in case all three quantities do not agree depends upon the special circumstances in each case. Four combinations of lack of agreement may arise. These are:

1. The branch house stock record and the main office control quantity, although in agreement with each other, may be greater or less than the physical inventory count.
2. The physical inventory and the main office control quantities, although in agreement with each other, may be greater or less than the branch house stock record quantity.
3. The branch house stock record and the physical inventory quantities, although in agreement with each other, may be greater or less than the main office control quantity.
4. All three quantities may differ, one with another.

Under conditions described in (1), adjustments should be made to both the branch house record and the main office record, provided of course that the physical inventory quantity has been correctly counted. In (2), the conditions given would in most cases warrant adjusting, without further consideration, the branch house stock record to the physical inventory count.

Under ordinary circumstances case (3) might warrant adjusting the main office record without any inquiry, thus putting all three quantities in agreement. However, special conditions may demand an investigation as to why the main office record and the branch house stock record of the material do not agree. Such an investigation would require tracing the branch office postings back to their supporting documents. If the postings agree with the records then it is probable that some error has been made in the main office record. A comparison of the transcript of one with the other should very soon point out the item or items causing the discrepancy.

When a condition such as described in (4) exists, it requires a verification of the accuracy of the inventory count, the audit of the branch house postings with the originating documents, the comparison of the stock record of the main office with that of the branch house, and the decision accepting the proper record quantity before adjustment, whether that quantity be the same as one or the other of the stock record quantities, or a newly established quantity.

It is not to be implied that the operations of audit as given here and required before making any adjustment, will cover all cases. True, most cases of differences may be handled in

accordance with the procedures described, but instances do arise from time to time which require special treatment on the part of the inventory auditor. With the complete facts before him he should have no great difficulty in handling them satisfactorily.

It is to be remembered of course, that where the differences are small and unimportant, reconciliations for the purpose of trying to account for those differences is a foolish task. The records should be adjusted without question. On the other hand, it is very important for many reasons that large discrepancies should be traced down and recorded before any adjustment is permitted.

Whatever the cause of difference between the three quantities given, the physical inventory quantity, if correct, must be used as the closing inventory figure, and all records must be adjusted to this amount. The difference between the physical inventory quantity and the correct record quantity is the amount that should go on the Report of Overages and Shortages.

Adjusting and Reconciling Branch House Stock Records—Prices.—Many branch houses operate their stock records to show not only quantity but in addition the amount of materials in dollars. When such is the case, the work of auditing, adjusting and reconciling is more involved for the reason that interposing prices in the records greatly increases the number of calculations and postings, and therefore multiplies the chance of error.

Although the quantity balance of the branch house records, the main office records, and the physical inventory may all agree, the dollar balance of the first two may not agree. (If the physical inventory quantity is in agreement with the branch house records there is no good reason why the dollar amounts should not also be the same.) Naturally the amount in dollars will not agree if there are differences in the quantities—provided the unit prices are the same.

The first thing to do in any case of discrepancy is to establish (*a*) the correct inventory quantity, (*b*) the correct unit price, and (*c*) the correct extension the former by the latter. The correct quantity to use is the verified physical inventory quantity. The correct unit price should be easily obtained from the most recent consignment billings, confirmed by the latest price lists and price list changes. This of course presumes that the branch house records are being charged and credited on the basis of selling

prices which is usually the case. The extension of the correct quantity by the correct unit price gives the correct amount of closing inventory *for the stock records.* For balance sheet purposes, however, this amount cannot be used. Instead the correct quantity is multiplied by whatever inventory price is adopted whether the price is based on cost, cost or market, selling price less selling expense, etc. The extension is then placed upon the inventory tag from which the final inventory details are tabulated.

Whatever the difference may be, both the main office and the branch house records must be adjusted to the correct figures. Then, if the *amount* of difference so warrants, an attempt may be made to run down and account for the details that make up that difference.

To sum up the preceding paragraphs with respect to comparing the inventory tags with the stock accounts. There are five principal operations, namely:

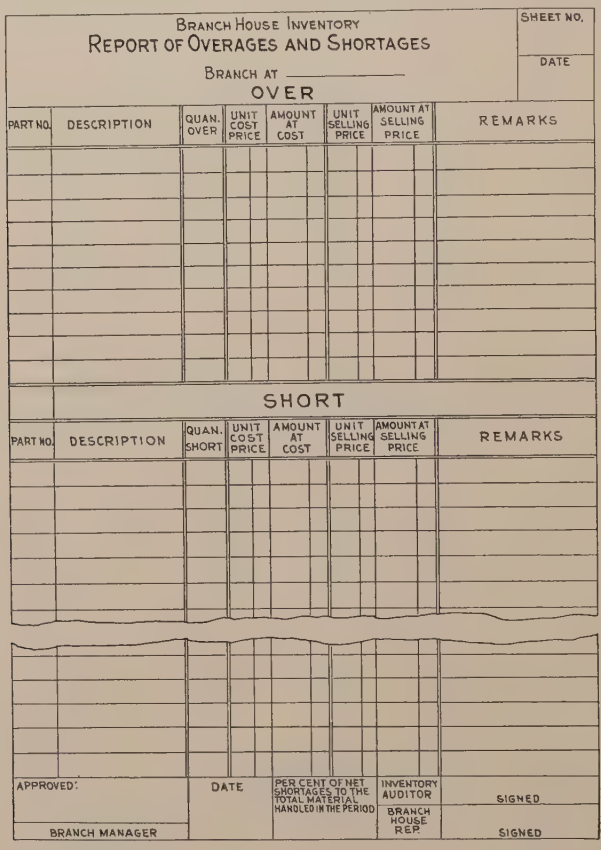
1. Compare the inventory tag with the material record.
2. If the material record is not in agreement with the correct physical inventory adjust the material record to the correct figure.
3. Enter a record of the shortage or overage on the report for the same.
4. If the discrepancy so warrants, reconciliation should be made between what *is* on hand and what *should be* on hand.
5. The correct closing inventory in every case should be entered in permanent form and signed by the parties at interest. This is generally accomplished by the use of the rubber stamp form previously shown.

Overages and Shortages.—It is not an uncommon thing for inventories of branch houses to be taken and computed for balance sheet purposes with no attempt made to learn the *amount* by which the inventory is short, to say nothing of the details making up that amount. Such a practice does not pay any compliment to the management of the concern countenancing it. While the inventory amount for balance sheet purposes and the cost of sales for profit and loss purposes may be just as correct under this method as under any other method there is one feature about it which is important enough to condemn it. It is the feature which prevents the details of the cost of sales being known.

Under this method the cost of sales is shown as one amount although there are two parts, each one of which is important enough to be shown separately. These two parts are: (*a*), Cost of

goods sold; (*b*), Cost of net material shortages (*i.e.* shortages less overages).

Item (*b*) represents the lack of material control measured in dollars. It is a most valuable item from a managerial and accounting standpoint and therefore should never be allowed to be consolidated with another amount unless it has first been established and



BRANCH HOUSE INVENTORY
REPORT OF OVERAGES AND SHORTAGES
BRANCH AT _____
SHEET NO.
DATE

OVER

PART NO.	DESCRIPTION	QUAN. OVER	UNIT COST PRICE	AMOUNT AT COST	UNIT SELLING PRICE	AMOUNT AT SELLING PRICE	REMARKS

SHORT

PART NO.	DESCRIPTION	QUAN. SHORT	UNIT COST PRICE	AMOUNT AT COST	UNIT SELLING PRICE	AMOUNT AT SELLING PRICE	REMARKS

APPROVED:	DATE	PER CENT OF NET SHORTAGES TO THE TOTAL MATERIAL HANDLED IN THE PERIOD	INVENTORY AUDITOR	SIGNED
BRANCH MANAGER			BRANCH HOUSE REP.	SIGNED

FIG. 36.—Report of averages and shortages—branch inventory.

set out distinctly by itself. Above is a form called "Report of Overages and Shortages." For administrative purposes the purpose of this form is twofold:

1. To give the details which make up the total shortage.
2. To afford officials a dependable record which they may use as the basis for instituting action to reduce preventable shortages to a minimum.

The form as given here is for illustrative purposes only. It will be found much more practicable if separate sheets are used for shortages and overages.

These reports are made out at each branch by the inventory auditor and then forwarded to the main office. It should be noted that the parties at interest sign this form at the branch house. This should prevent any controversy arising later in case one party attempts to use different figures. The inventory auditor leaves the columns Unit Cost Price and Amount at Cost to be filled in by the main office since that office only, has the cost figures. When the main office has supplied these cost figures, the sheets should be totaled and summaries made therefrom. This completed, the detail sheets and their summaries may be used for the following purposes:

1. Adjusting the detail stock control records in the main office.
2. Adjusting the stock control account kept at selling prices, for each branch.
3. As the basis for a charge to Cost of Material Shortages through a journal entry, and the final clearing of this account into the account Cost of Sales.

Completion of Inventory.—When the work of comparing the inventory tags with the material records at the branch house has been completed, all adjustments made, and the correct inventory quantities and amounts entered and signed, the inventory tags should be packed up and shipped to the main office for pricing.

Instructions are sometimes issued to arrange the tags in tag number order before returning them, but if the material records at the main office are kept in the same order as those at the branch (and this is usually the case) it may be best to allow them to remain in the order used in verifying the branch house records. This will permit pricing to commence without the need for resorting. This should be done only if the tags are packed under the direction of the inventory auditor. Otherwise some tags may be lost or mislaid at the branch house and not discovered missing until the inventory sheets have been made up and summarized.

After the tags have been priced, and the information hereon transferred to inventory sheets, they may then be resorted by tag numbers, and permanently filed for future reference purposes.

CHAPTER XI

THE RETAIL METHOD OF INVENTORY

The so-called "retail method of inventory" is the name given to a series of accounting processes, taken collectively, the primary purpose of which is to establish the valuation of an inventory by means of retail or selling prices, and the second purpose of which is to furnish dependable data for merchandise management and control.

Roughly, the principle of the retail method may be explained in the following manner:

If to the cost of an article is added an amount known as the purchase mark-up, the result is the retail or selling price. Each amount of purchase mark-up bears a certain ratio to the selling price, which ratio may be expressed as a percentage. This percentage called the "average per cent of purchase mark-up" or "average per cent of mark-up," measures the proportion of the retail price that is gross profit. Applying the complement of this percentage to the retail price at any time brings the retail price back to the original cost.

Example:

Cost	$1.00
Mark-up	.50
Selling price	$1.50

The mark-up is $33\frac{1}{3}$ per cent $\left(\frac{.50}{1.50}\right)$ of the selling price.

The complement of $33\frac{1}{3}$ per cent is $66\frac{2}{3}$ per cent.

Applying $66\frac{2}{3}$ per cent to $1.50 gives $1, or the original cost.

Based on the above principle then, the *cost* of an inventory can be readily and accurately determined if the correct retail price of the merchandise on hand and the correct per cent of mark-up to the retail price are known. While the principle upon which the retail method is based is simple, the practical application, involving as it does a great many details, is not without its problems. If it were a fact that the retail prices of merchandise as originally fixed were never changed; if goods remained in, and were sold only from, those departments to which they were

originally charged; if merchandise, once sold, was never returned for credit or allowance by customers; if no special discounts were given to employees and certain customers; if low mark-up merchandise was never purchased for special sales; if a great many other matters were not as they now exist—then the operation and application of the retail method of inventory would be practically as simple as its principle. Unfortunately the above Utopian conditions do not exist. Because the average per cent of purchase mark-up must be accurately established and maintained and because each of these matters above if improperly treated may seriously affect its correctness, it is necessary that each detail be given careful and studied consideration. Before going into the details of the retail method, however, it may be interesting to trace briefly its development.

For some years prior to the Federal income tax law, which by the way is more responsible directly and indirectly for the general adoption of this method by retailers than any other thing, a few concerns (especially dry goods stores) were utilizing a method whereby through the means of special books or forms they were able to calculate roughly the average mark-up per cent at which their stock of inventory was being carried. Applying this per cent to sales gave what they considered a fairly accurate figure of gross profits, and in addition allowed them to calculate the amount of inventory (at cost) on hand. One average per cent of mark-up to retail price was generally carried for the store as a whole. While this procedure presumably gave approximate figures of profit and inventories during the operating period, in many cases they were so inaccurate as to be seriously misleading and often caused serious financial embarrassment.

Although the principles upon which the method was based were generally correct, failure to consider and to handle all important details properly gave the unsatisfactory figures which resulted. The principal details which did not get their deserved attention at that time were departmentalizing the store and the control of mark-downs. Although many other details were slighted these two above were enough to make questionable whatever figures were used.

It is not to be implied from the above that all concerns, prior to the income tax laws, were using unreliable percentages of mark-up to establish gross profits. On the contrary quite a few dry goods firms, especially the larger ones, were getting approxi-

mately the same results as they are now obtaining under the more recently accepted method. And it was because these larger concerns were getting satisfactory results that they were not only instrumental in blazing a trail for others to follow, but, they were mainly responsible, acting through the National Retail Dry Goods Association and the Controller's Congress of that association, in obtaining the recognition and acceptance of the retail method on the part of the Federal tax officials as a means for determining taxable income.

Although as of Dec. 1, 1920 the Bureau of Internal Revenue took official recognition of the retail method in Treasury Decision 3058 which amended Regulations 45, by inserting Art. 1588, and although many procedures were interpreted by the Treasury Department (see letter to the National Retail Dry Goods Association dated Jan. 21, 1921), it was not until Mar. 23, 1923 when Income Tax Mimeograph 3077 finally cleared up many matters which, as far as Federal taxes were concerned, had deterred many concerns from adopting the retail method. The association mentioned above, in urging for the recognition of the "retail method" on the part of the Bureau of Internal Revenue and in working closely with that Bureau in overcoming obstacles and clearing up interpretations of procedures, is deserving of the greatest credit.

The natural result of such efforts has been to focus the attention of a large number of retail concerns, heretofore operating under the so-called "cost method," upon the "retail method." While the attention of such concerns has been attracted to the retail method by reason of its applicability to income taxes, those concerns adopting it have not been "sold" on this feature alone. Principally through the efforts of the National Retail Dry Goods Association they have been shown the many additional advantages which such a method affords *during* the operating period. Although the chief purpose of this section is to show in detail how the valuation of a retail inventory may be accurately determined by use of the retail method, many of the supplementary advantages are so important as to deserve attention. At times then, it may not be amiss to consider such matters briefly.

Terms Used in Retail Method of Inventory.—There are terms used in connection with retail concerns which must be clearly understood if a complete grasp of the details of the retail method is to be obtained. While, for example, some terms such as "pur-

chases," "cost," etc., may appear off hand to need no comment, it will be seen that these terms, even within the retail field, have different interpretations placed upon them. For the present, however, the following retail terms will be defined and explained:

1. Mark-up.
2. Additional mark-up.
3. Mark-up cancellations.
4. Mark-downs.
5. Mark-down cancellations.
6. Mark-up percentage.
7. Transfers.

Mark-ups and Mark-downs.—The broad meanings of the expressions "mark-up" and "mark-down"—terms peculiar to retail merchantile business—are generally known. Their exact definitions, however, are not so generally understood. For this reason and for the purpose of avoiding any misunderstanding throughout this book where these expressions are used the following definitions are given:

Mark-up (Original).—An original mark-up is the amount by which the original retail price of an article exceeds the cost; the amount added to the cost to establish the original retail price.

Mark-up (Additional).—An additional mark-up is the amount by which a new retail price exceeds the original retail price.

Additional Mark-up Cancellation.—An additional mark-up cancellation is the amount by which an additional mark-up is reduced. This cancellation amount cannot exceed the amount of the additional mark-up.

Net Mark-up.—Net mark-up is the amount established by subtracting all additional mark-up cancellations from the sum of the original mark-up plus the additional mark-ups.

Mark-downs.—A mark-down is the difference between the original retail price and a new but lower retail price; the amount by which the original retail price is reduced in establishing a lower selling price.

Mark-down Cancellation.—A mark-down cancellation is the amount by which the amount of mark-down is reduced. While it is a fact that the retail price of merchandise must be increased to reduce the amount of mark-down, such increase is considered as a cancellation of the original mark-down rather than a mark-up.

Net Mark-down.—Net mark-down is determined by subtracting from the sum of both the original mark-down plus subsequent mark-downs, the mark-down cancellations.

Mark-down cancellations must not be confused with or considered as mark-ups. It is important that these two items be handled carefully because the latter affects the average per cent of mark-up under the retail method (as is shown later), while the former does not. When the term mark-up, without any further description, is employed in subsequent discussions, it is intended that it be understood to mean the *original* mark-up.

Once the original retail or selling price has been established, all subsequent price changes *above* that price fall within the class of either additional mark-ups, or additional mark-up cancellations, while on the other hand, all subsequent changes *below* the original retail price are mark-downs, or mark-down cancellations. The original retail selling price, then, is the point which determines the status of a price change.

To illustrate this matter let the following figures and transactions be assumed. An article is purchased for 50 cents and marked-up 25 cents. The *original retail price* is then 75 cents. This price is later found to be too low, so the article is priced at 85 cents. This additional 10 cents to the original retail price (75 cents) is known as an *additional mark-up*. This new retail price (85 cents) is now found to be too high so the price is reduced to 80 cents. This reduction of 5 cents (from 85 cents to 80 cents) is known as an *additional mark-up cancellation*. Should the article still be priced too high it may be reduced to 75 cents when the mark-up cancellation will just off-set the additional mark-up. If the article is now priced *below* the original retail price (75 cents) a *mark-down* is taken, measured by the difference between the original retail price and the new retail price.

In this case let it be assumed further that the article, because of lack of demand, has its retail price fixed at 60 cents. As a result there is a *mark-down* of 15 cents. If the price is now increased to 65 cents for any one of many reasons, the amount of the *mark-down cancellation* is 5 cents and the *net mark-down* is 10 cents (75 cents − 65 cents).

Mark-up Percentage.—Mark-up is expressed not only in amount but also in terms of a percentage. This percentage, known as the percentage of purchase mark-up to retail, is determined by dividing the *amount* of the mark-up by the retail price. Sometimes the mark-up is expressed as a percentage of cost. This latter percentage, however, although useful for certain statistical purposes, cannot be usefully applied in the retail inventory method.

Either percentage, however, whether the ratio of mark-up to selling price or mark-up to cost, expresses the relation of gross profit to either the selling price or the cost, respectively.

Aside from the fact that the percentage of mark-up to selling price is the accepted means for determining gross profit and cost of sales from the amount of sales, it is a percentage which has one big advantage over the percentage based on cost. Since profit cannot exceed the selling price the former percentage can therefore never exceed 100 per cent. The latter percentage, however, can exceed 100 per cent. This is so because the amount of profit on an article may exceed its cost. Keeping the percentage within the limits of 100 per cent establishes a basis for better comparisons. To illustrate this point: An article is purchased for 10 cents and is marked-up to 40 cents. The mark-up therefore is 30 cents. Expressed as a percentage of the retail price (40 cents), the mark-up is 75 per cent of that retail price; expressed as a percentage of the cost (10 cents) the mark-up is 300 per cent of that cost.

Method for Recalculating Percentage of Mark-up.—From time to time it may be necessary, having one kind of percentage, to establish the other. That is, the per cent of mark-up to retail price being given, it is required from that percentage alone to calculate the percentage of mark-up to the cost. Or the reverse may be true. Whichever one may be required, it is possible to obtain them by use of the following rules:

1. *Rule for Determining the Percentage of Mark-up to Cost Being Given the Mark-up Percentage to Retail.*—Subtract from 100 per cent the per cent of mark-up to retail. Divide the difference into the per cent of mark-up to retail. The result is the per cent of mark-up to cost.

Example: The mark-up per cent to retail price is 20 per cent.

What is the mark-up per cent to the cost?
100 per cent − 20 per cent = 80 per cent
20 ÷ 80 = .25
Mark-up per cent to cost = 25 per cent.

2. *Rule for Determining the Percentage of Mark-up to Retail Price Being Given the Mark-up Per cent to Cost.*—Add to 100 per cent the per cent of mark-up to cost. Divide this total into the per cent of the mark-up to cost. The result is the per cent of mark-up to retail price.

Example: The mark-up per cent to cost is 25 per cent.

What is the mark-up per cent to retail price?
100 per cent + 25 per cent = 125 per cent
25 ÷ 125 = .20
Mark-up per cent to retail price = 20 per cent

Transfers.—Goods originally charged to one department and subsequently transferred to another department are generally known as "transfers."

Development of Retail Method—Presentation.—In order that the development of the form employed under the retail method may be shown, now that the meanings of the various terms used are fully understood, several examples, starting with the most simple, are given here. The first example, for the sake of simplicity, includes but purchases and sales. No consideration in this case, is given to an opening inventory, mark-downs, transfers, etc. In the second example, including as it does transactions of two months, the treatment of an opening inventory, in addition to purchase and sales, is shown. This example, however, does not take into consideration mark-downs, transfers, etc., matters which will be brought out later.

The transactions and figures applicable to the first example are:

Purchased in January at cost, $10,000 of merchandise which was marked-up $5,000 to retail for $15,000. During the month sales amounted to $9,000. What was the amount of inventory at cost at the end of January?

The per cent of mark-up to retail ($5,000 ÷ $15,000) is 33⅓ per cent. Hence every dollar of sales contains 33⅓ per cent gross profit and 66⅔ per cent cost. As the amount of sales was $9,000 then $3,000 was profit and $6,000 was cost. The cost of all merchandise was $10,000 of which $6,000 has been sold. Therefore the amount of inventory, at cost, at the end of the month was $4,000. This amount of inventory at the end of the month at cost can also be determined by finding the amount of inventory on hand at retail and applying the complement of the percentage of mark-up ($6,000 × 66⅔ = $4,000).

The above figures can be set up in this manner:

EXAMPLE I

	Cost	Mark-up	Retail	Per cent of mark-up to retail
Purchases—January	$10,000	$5,000	$15,000	33⅓
Sales—January	6,000	3,000	9,000	33⅓
Inventory—end of January	$ 4,000	$2,000	$ 6,000	33⅓

Let it further be assumed that during February purchases, at cost, amounted to $20,000. These were marked-up $6,000 to retail at $26,000. The sales during February amounted to $12,000. What was the amount of inventory at cost at the end of the month? Combining both January and February transactions results in the following presentation:

EXAMPLE II

	Cost	Mark-up	Retail	Per cent of mark-up to retail
Purchases—January	$10,000	$5,000	$15,000	33⅓
Sales—January	6,000	3,000	9,000	33⅓
Inventory—end of January	$ 4,000	$2,000	$ 6,000	33⅓
Purchases—February	20,000	6,000	26,000	23
Total	$24,000	$8,000	$32,000	25[1]
Sales—February	9,000	3,000	12,000	25
Inventory—end of February	$15,000	$5,000	$20,000	25

[1] The per cent of mark-up to retail expresses the relation between the total mark-up and the total retail figure. It is not established by averaging the preceding percentages.

It will be noted that the per cent of mark-up in February (25 per cent) differs from that used in January (33⅓ per cent). Although the opening inventory for February carried a ratio of 33⅓ per cent between the mark-up and the retail, heavy purchases during February with a smaller per cent of mark-up caused the average per cent applicable to all merchandise handled during the month of February to fall to 25 per cent.

Of the total amount of merchandise handled ($32,000 at retail), $12,000 at retail, was sold. Thus 25 per cent of such sales was gross profit and the remaining 75 per cent, cost of goods sold. The per cent of mark-up to apply to sales in order to determine gross profits directly, or indirectly to determine the cost of the retail inventory on hand, is the ratio of the mark-up to the retail of all merchandise handled during the month. "Merchandise handled" is the sum of the inventory at the commencement of the month plus all purchases and other inventory additions during the month.

Treatment of Mark-downs.—In the two examples given above, mark-downs have not been considered for the simple reason that to do so would make the matter too complex at the start, since there are several methods by which mark-downs may be incorporated into the retail method set-up, each one of which may effect different results. This, however, is not to be construed as admitting that one method of mark-down treatment is as good as another. While three methods of handling mark-downs, so far as they may or may not effect the average mark-up, are given here, there is one method which is considered as more acceptable than either of the other two.

Whereas the *amount* of mark-up and additional mark-ups increase gross profits, mark-downs being just the opposite to mark-ups, decrease gross profits. Off hand then it would appear as being logical that if mark-ups establish mark-up percentages to retail, mark-downs reduce those percentages. Theoretically this is so, but for practical reasons as explained later, the best treatment in the handling of mark-downs does not allow the average mark-up percentage to be affected by mark-downs. In this connection there would be no problem with respect to mark-downs if no inventories were carried into the next period. However, conditions must be accepted as they are and the problem must be considered and solved in the most practical manner possible.

The three cases which follow are based upon figures used in connection with identically the same transactions. These transactions are self-explanatory in each of the three presentations.

EFFECT OF MARK-DOWNS UPON AVERAGE PER CENT OF MARK-UP

Case I

(Where the full effect of mark-downs taken in one period is reflected in the profits of the subsequent period or periods)

	Cost	Mark-up	Retail	Per cent of mark-up to retail
Opening Inventory—Jan. 1	$10,000	$3,000	$13,000	23
Purchases during January	5,000	2,000	7,000	28
Opening Inventory Plus Purchases	$15,000	$5,000	$20,000	25
Less Sales during January	3,750	1,250	5,000	25
	$11,250	$3,750	$15,000	25
Less Mark-downs in January	.....	1,000	1,000	
Closing Inventory—January	$11,250	$2,750	$14,000	19

Case II

(Where the effect of mark-downs taken in one period is reflected not only in the profits of the same period but also in the profits of subsequent periods)

	Cost	Mark-up	Retail	Per cent of mark-up to retail
Opening Inventory Jan. 1	$10,000	$3,000	$13,000	23
Purchases during January	5,000	2,000	7,000	28
Opening Inventory Plus Purchases	$15,000	$5,000	$20,000	25
Less Mark-downs in January	.....	1,000	1,000	
	$15,000	$4,000	$19,000	21
Less Sales during January	3,950	1,050	5,000	21
Closing Inventory—January	$11,050	$2,950	$14,000	21

CASE III

(Where the full effect of mark-downs taken in one period is reflected in the profits of the same period)

	Cost	Mark-up	Retail	Per cent of mark-up to retail
Opening Inventory Jan. 1	$10,000	$3,000	$13,000	23
Purchases during January	5,000	2,000	7,000	28
Opening Inventory plus Purchases	$15,000	$5,000	$20,000	25
Less: Sales during January	4,500	1,500	(5,000)	
Mark-downs in January			(1,000)	25
Closing Inventory—January	$10,500	$3,500	$14,000	25

CASE I

It must be stated first with respect to this method that the gross profit for the period (January) is in no way diminished by such mark-downs as have been taken. The result is to throw into the subsequent period the loss caused by the mark-downs in January. The figures make this very apparent.

In the first place it is to be noted that the percentage of retail mark-up (25 per cent) used for calculating both the gross profit and the cost of sales has not been affected by the mark-down of $1,000. Deducting the cost of sales $3,750 from the total of the cost of the opening inventory plus the cost of purchases during January leaves a closing inventory of $11,250 which is unaffected in any way by the mark-downs. This figure is carried into the subsequent period without change. On the other hand the amounts of the mark-up and the retail value, both affected by the mark-down, are carried into the subsequent period changed to the extent of $1,000 each from the totals remaining after consideration of the figures resulting from sales.

Since this method allows the inventory at cost within the period to be unaffected by mark-downs within the same period, the gross profit remains without change. The full force of the mark-downs is felt in the next period because with the percentage of mark-up reduced to 19+ per cent for the opening inventory, the gross profit on each dollar of subsequent sales is considerably reduced. Thus the period which follows bears the penalty for

mark-downs in January. The result of this method is to pass the entire burden of mark-downs taken in one period to the next.

It should be noted in this example that the closing inventory (at cost) is the largest of the three cases shown here, and that the per cent of mark-up carried forward is the smallest.

CASE II

In this case the average percentage of retail mark-up for January applied to the retail sales to establish gross profits, *is* affected by the mark-down. This percentage as used here is not 25 per cent, the figure used in Case I, but instead a trifle over 21 per cent. With this new percentage applied to the retail sales the gross profit is $1,050 (approximate) and the cost of sales $3,950. This latter figure deducted from the total of the opening inventory plus the purchases during January, both at cost, leaves a closing inventory of $11,050, which is carried forward to the next period. Comparing this figure with the closing inventory in Case I shows that it has been affected by the mark-down to the extent of approximately 4 per cent of the retail sales for January.

The amount of mark-up carried into the subsequent period shows an increase over the amount carried forward in Case I. With the amount of retail value carried forward remaining constant ($14,000) and the amount of mark-up increased, percentage of mark-up carried forward is therefore larger than in Case I.

CASE III

This example differs from either of the previous examples in that the entire amount of mark-downs is charged against profits within the period in which the mark-downs are taken. This procedure thus allows the subsequent period the benefit of its own profits without diminishment due to all or a part of the amount of mark-downs of previous periods. The average per cent of mark-up to retail value is likewise not affected by the mark-downs. The same percentage as is applied to retail sales in order to determine the amount of mark-up in those sales, is also carried forward into the next period.

It will be noted that the figures given in the first three lines in Case III agree in all respects with those in the other two examples. The treatment, however, of the retail sales plus the

mark-downs as one amount, and its employment as the base for applying the average percentage of mark-up for establishing the amount of mark-up absorbed in the period, is the determining factor in this case. Applying 25 per cent to $6,000 ($5,000 sales plus $1,000 mark-down) gives the mark-up absorbed (gross profit plus mark-downs) of $1,500, and the cost of goods sold as $4,500.

What are the results of this procedure? They are these. The *cost of sales* for January is increased; the closing inventory at cost is smaller than in the two other cases; the amount of mark-ups carried into the subsequent period is increased; and with the amount of the retail inventory on hand at the close of the period still the same, the per cent of mark-up to the retail value carried forward is larger. Thus January in this case, absorbs against its profits all the mark-downs taken in January, and the subsequent period commences with an inventory which is not affected in any way by unabsorbed mark-downs such as exist in Cases I and II.

The theory back of consolidating the amount of retail sales with the amount of mark-downs before applying the average percentage of mark-up to determine gross profit and also cost of sales is briefly stated, this:

> A portion of the retail sales in any period is made possible by the sale of goods marked down within the same period. If the marked-down goods sold in the period were disposed of at their original retail prices, the amount of retail sales would be increased by the total amount of the mark-downs, and the gross profit would be determined by applying the average percentage of mark-up to this amount.

Hence in Case III to the amount of the actual retail sales ($5,000) is added the amount of mark-downs ($1,000) and to the total ($6,000) is applied the percentage of 25 per cent. The result (or $1,500) is the amount of mark-ups absorbed to be deducted from the total mark-up of $5,000 in establishing the amount of mark-ups to be carried into the next period. From this $1,500 however, must be deducted the total amount of mark-downs ($1,000). The difference, or $500, is the gross profit for the period.

To prove the correctness of the figures; the gross profit for the period plus the mark-ups carried to the next period plus the amount of mark-downs equals the amount of the original mark-up ($500 + $3,500 + $1,000 = $5,000).

Approved Practice with Respect to Mark-downs.—Of the three methods of treating mark-downs Case III is now recognized as the most practical and hence most acceptable. This method, it is noted, makes the period within which the mark-downs were taken bear the entire burden of mark-downs against its profits. The method of treatment as presented in Case II has had many followers who have argued for this method more from the standpoint of correct theory than correct practice. The main point of difference between these two methods is the question of when the goods, upon which mark-downs are taken, are disposed of, *i.e.*, in the period when the mark-downs were taken or partly in that period and partly in the subsequent period.

The arguments in favor of Case III are:

1. That the purpose of mark-downs is to dispose of goods, which for some reason or reasons, are not selling as they should. This is not necessarily due to too high an original mark-up.
2. That mark-downs are taken not only to dispose of the goods but to dispose of them quickly. This is evidenced by the special advertising of bargain days, bargain items, etc.
3. That although goods on which mark-downs have been taken near the end of a period may not all be disposed of within the period, the amount that goes over into the next period is so small as to warrant slight consideration.
4. That for all practical purposes, goods which have been marked down may be considered as sold within the period in which the mark-downs were made.

On the other hand, those who are in favor of the method as shown in Case II proceed on the assumption that the mark-downs are spread evenly over the entire inventory; that each dollar of retail sales made within the period and also each dollar of the retail value of the inventory carried into the subsequent period must bear its respective share of the mark-downs by the adjustment downward of the average purchase mark-up percentage. As it is quite unusual to find instances where conditions coincide with the above assumption it is not too broad a statement to say that in the greater majority of cases the method described in Case II will not be found applicable.

Computing Inventory According to Retail Method.—The forms of arrangement for computing the inventory according to the retail method shown in the preceeding pages, have been intentionally

FORM FOR COMPUTING INVENTORY ACCORDING TO THE RETAIL METHOD
(Department 18)

Item	Factor	Cost	Mark-up	Retail	Per cent of mark-up to retail
		Col. 1	Col. 2	Col. 3	Col. 4
	Inventory and Inventory Increases:				
A	Inventory at Beginning of the Period	$40,000	$20,000	$60,000	33⅓
B	Purchases during Period (including Transportation Charges)	9,000	3,000	12,000	25
C	Transfers Received from Other Departments	2,000	2,000	4,000	50
D	Additional Mark-ups Less Cancellation of Additional Mark-ups	******	500	500	***
E	Total of Inventory and Inventory Increases	$51,000	$25,500	$76,500	33⅓
	Inventory Decreases:				
F	Net Sales during Period	*******	*******	$16,000	***
G	Mark-downs Less Mark-down Cancellations during Period	*******	*******	2,000	***
H	Transfers to Other Departments	*******	*******	1,500	***
J	Total Inventory Decreases—at Retail Only	*******	*******	$19,500	***
K	Book Inventory (Retail) at End of Period (Item *E*, Col. 3, Minus Item *J*)	*******	*******	$57,000	***

Calculation for Reducing Retail Book Inventory to Cost:

	Book Inventory (Retail at End of Period) (Item *K*)		$57,000
	Less: Amount of Mark-up in Retail Inventory at End of Period		19,000
	Book Inventory (Retail) (Item *K*)	$57,000	
	Average Per Cent of Mark-up to Retail (See Item *E*, Col. 4)	33⅓	
	Amount of Mark-up in Retail Inventory	$19,000	
L	Cost of Inventory on Hand at End of Period		$38,000

		Cost	Mark-up	Retail	Per cent of mark-up to retail
M	Inventory on Hand at End of Period (Book)	$38,000	$19,000	$57,000	33⅓
		See Item *L*	Difference between retail and cost	See Item *K*, Col. 3	See Item *E*, Col. 4

N	*Physical Inventory:*		
	Physical Inventory on Hand at End of Period (at Retail)		$52,500
	Average Per Cent of Mark-up to Retail		33⅓
	Amount of Mark-up in *Physical* Inventory		17,500
	Cost of Physical Inventory on Hand at End of Period		35,000
	Physical Inventory on Hand at End of Period (at Retail)		$52,500

		Cost	Mark-up	Retail	Per cent of mark-up to retail
O	*Adjustments:*				
	Book Inventory (see *M*)	$38,000	$19,000	$57,000	33⅓
	Physical Inventory (see *N*)	35,000	17,500	52,500	33⅓
	Differences	$ 3,000	$ 1,500	$ 4,500	

NOTES.—1. Those sections of each column which have been "starred" as follows ***** are not to be used in any computation.

2. Purchases (Item *B*) refers to net purchases during the period.

3. Net Sales (Item *F*) includes sales, at discounted prices, made to employees of the concern.

4. Item *G* should include all discounts given to employees on merchandise purchased by them unless it is desirable to show such discounts under a caption called "Employees' Discounts."

made incomplete in order that the explanations of the general principles might not be made complex. These forms, therefore, by reason of their incompleteness, cannot be used in practice. A form which is both complete and practicable is the one on p. 194. It should be especially noted that mark-downs on this form, in accordance with the recommended practice, are entirely absorbed in the period in which they have been taken and hence do not affect the average percentage of mark-up. It should not be difficult after a study of this form, to understand the effect of each factor upon the average per cent of mark-up to retail, and also the method of determining the cost of inventory from the inventory at retail.

Adoption and Operation of the Retail Inventory System.—In connection with the operation of the retail inventory system, several very clear and concise explanations have been made from time to time by persons who have been most active in urging the adoption of this system on the part of retailers. Prominent among such persons is T. L. Blanke, Director of the Bureau of Accounting and Control, Controllers' Congress of the National Retail Dry Goods Association. One statement of Mr. Blanke with respect to the operation of the system is deserving of careful consideration. It is the following:

> The operation of the system may be briefly explained, as follows: To install the system it is necessary to take the inventory of merchandise on hand in each selling department at both cost and retail, in order to establish the average percentage of mark-up to begin with. To this is added the value of all merchandise, as received, by departments at cost and retail. These cost and retail values are accumulated during the year, by periods. The total retail value minus the total cost value equals the total purchase mark-up to date, which divided by the total retail value gives the percentage of purchase mark-up to date. To arrive at the retail value of the goods on hand at the end of any period, the above accumulated total is credited with the total sales at retail, and all reductions at selling price, less such mark-ups as are cancellations of mark-downs previously taken. The resultant figure is the value of the inventory at hand at retail at the close of the period, be it weekly, monthly, or by any other periods we may be reckoning. Physical inventories, by departments, are taken of the goods on hand at retail at the close of the fiscal year, and the retail value of the book inventory of goods on hand is adjusted accordingly. The cost value of the goods on hand is then computed by subtracting from 100 per cent, the percentage of purchase mark-up, which gives the percentage of cost,

and multiplying the retail value of goods on hand by such percentage of cost.

This system has been approved by the Federal government through the Department of Internal Revenue and by the leading public accountants in the country. Its general practicability and desirability has been firmly established. It meets the requirements of the department store so satisfactorily and is so comparatively inexpensive to operate that it is now considered a necessity for proper store management. In fact, the president of one of the largest metropolitan department stores in the country made the statement a few years ago that if they were obliged to go back to the cost system of inventorying it would increase the operating expense alone to $600,000; another somewhat smaller store claims they would suffer to the extent of at least $200,000.

Recognition of Retail Method by the Treasury Department.—Although the Treasury Department is interested in the retail method only in so far as the pricing of inventories is concerned, its recognition and acceptance of the method have done more than anything else to bring retailers around to adopting and installing it. Accepting the method first as a means for quickly and accurately determining the value of his inventory, the retailer has found accruing to him by its use a great many other advantages which in the past he never enjoyed. But primarily the retail method is operated to determine inventory valuations for income tax purposes. The natural result then is to operate such a method under such rules and procedures as the Treasury Department has prescribed.

Under Section 203 of the Federal Income Tax Law of both the Revenue Acts of 1918 and 1921 respectively;

> . . . inventories shall be taken by such taxpayer upon such basis as the Commissioner, with the approval of the Secretary, may prescribe as conforming as nearly as may be to the best accounting practice in the trade or business and as most clearly reflecting the income.

This section of the law places upon the Commissioner the responsibility of prescribing what methods of pricing inventories are, or are not, acceptable to the Treasury Department in determining income for tax purposes, provided the accepted methods have the approval of the Secretary of the Treasury. With authority based upon this section of the Revenue Act of 1918, the Commissioner with the approval of the Secretary took general recognition of the retail method of inventory through Treasury Decision 3058, which amended Regulations 45 by the insertion of Art.

1588. This treasury decision dated Aug. 16, 1920, reads as follows:

(T. D. 3058)
INCOME TAX
Section 203, Revenue Act of 1918: Inventories of Retail Dry Goods Dealers

Treasury Department

Office of Commissioner of Internal Revenue, Washington, D. C.
To Collectors of Internal Revenue and Others Concerned:

Regulations 45 are hereby amended by inserting Article 1588, reading as follows:

Article 1588. *Inventories of Retail Dry Goods Dealers.* (1) Retail dry goods dealers who employ the "retail method," which is essentially a "cost" method of valuing inventories, will be permitted to make their returns upon that basis, provided (*a*) that the use of such method is designated upon the return, (*b*) that accurate accounts are kept, and (*c*) that such method be adhered to in subsequent years, unless a change is authorized by the Commissioner. The "retail method" consists in computing the "cost" of goods on hand from the "percentage of purchase mark-up" and the "retail value" of goods on hand.

(2) A taxpayer employing the "retail method" of valuing inventories shall maintain and preserve in permanent form, for the inspection of internal revenue officers, the accounts and records of each year, together with a schedule of all mark-downs in each department, and such mark-downs shall not be included in the computation of the retail value of goods on hand unless the goods so marked down have been actually sold.

(3) The following general plan of taking an inventory by the "retail method" will, it is believed, be found readily adaptable to the requirements of most retail dry goods dealers:

(A) *The percentage of purchase mark-up* is computed as follows: The value of all merchandise, as received, is recorded by departments at two prices, (*a*) invoice cost plus transportation, and (*b*) original retail sale price. These cost and retail values are accumulated as recorded during the year. The total retail value minus the total cost value equals the total purchase mark-up, which divided by the total retail value gives the percentage of purchase mark-up.

(B) *The retail value of goods on hand* is computed as follows: A record is kept of (*a*) the amounts of all sales at retail, (*b*) any variations from the inventory prices of the preceding year of goods carried over from that year, and (*c*) any variations from the original sale prices, such as subsequent mark-ups or mark-downs (note Paragraph 2). The retail value of the opening inventories plus the retail value of the purchases

(plus or minus the algebraic sum of all subsequent mark-ups, and mark-downs in the case of goods actually sold) minus the retail value of the sales equals the retail value of the book inventory of goods on hand. Physical inventories by departments are taken of goods on hand at retail at the close of the taxable year, and the retail value of the book inventory of goods on hand is adjusted accordingly.

(C) *The cost of goods on hand* is computed by subtracting from one hundred per cent, the percentage of purchase mark-up, which gives the percentage of cost, and multiplying the retail value of goods on hand by such percentage of cost.

(*Signed*) PAUL F. MYERS,
Acting Commissioner of Internal Revenue.

Approved: August 16, 1920
S. P. GILBERT, JR.,
Acting Secretary of the Treasury.

For some months following Treasury Decision 3058 it was only natural that those interested in the retail method should seek interpretations and further enlightenment with respect to several important matters contained in that decision. In view of the approval of this method retail firms were studying its effect so far as taxes were concerned but were proceeding cautiously with its adoption. Especially so, since it was not definitely known then exactly what the government's attitude would be in respect to certain matters. In order to clear up apparent misunderstandings on the part of retailers, the National Retail Dry Goods Association took the initiative and inquired of the Bureau of Internal Revenue about several specific and important points. In answer to this inquiry the Bureau replied in the following letter:

Treasury Department
Washington, January 21, 1921

National Retail Dry Goods Association,
200 Fifth Avenue,
New York, N. Y.

Sirs: Reference is made to your letter of January 13, 1921, relative to Treasury Decision No. 3058, issued August 16, 1920 (Article 1588—Inventories of Retail Dry Goods Dealers), asking for further details as to proper procedure within the meaning of the Regulations.

Your questions are taken up and answered in the order you have presented them:

1. The use of the retail method is by the decision confined to retail dry goods dealers. Other organizations and individual stores who con-

duct retail establishments and follow essentially the retail method of dry goods stores, may be allowed this method upon application to the Bureau of Internal Revenue.

2. *The designation of the method as a "cost" method.* It was not intended that the apparent limitation should be inflexible. It is recognized that on a constant or rising market the retail method is approximately a "cost" basis and that on a falling market it results in reduction to "cost or market, whichever is lower."

3. *Preserving records.* There must be a permanent form of recording by departments, purchases showing the firm name, date of invoice, invoice cost, and retail sales price. A permanent record must be kept of the accumulation of all department purchases, mark-downs, sales stocks, etc. It must be borne in mind that under no circumstances will arbitrary standard percentages of purchase mark-up be allowed in the determination of the "cost" or "cost or market" value of retail inventories, but that such percentage must be the purchase mark-up percentage disclosed by the department records of the fiscal period for which the return is made.

4. *Opening inventory.* In section "A" the words "the value of all merchandise as received" is inclusive of inventory at the beginning of the period.

The purchase mark-up must be computed as follows:

Cost: Inventory at cost at beginning.
Purchases at cost.
Transportation.
Retail: Inventory at sales price.
Purchases at sales price.

5. *Appreciation in retail values of goods on hand.* Within the meaning of the Article, it is proper to include as a part of "original retail sales price" the actual increase in the original sales price which has been brought about by market conditions or by incorrect pricing when the goods were put into stock.

For the convenience of the examining officer, a special form should be provided; complete information by items of the increase from the original retail must be shown; reference, if possible, must be made to the original invoice; entry and the reason for the increase freely explained. All such amended retail increases must be approved by the buyer of the department and merchandise manager or other responsible official and they should be so filed that quick reference to them may be made. Entry of such increased retail properly belongs in department purchase books, although it may be set up as a separate item in the accumulated records of the department. The same forms that are used to record such price increases should not be used for mark-downs and in no instance will a store be allowed to include as retail increases a

mark-up which has been taken as a correction or cancellation of a mark-down; such mark-up must be regarded and treated in all cases as opposite to mark-down.

6. *Proper mark-downs substantiated by record of facts will be permitted.* The decision is not intended to disturb the procedure in stores which have properly handled mark-downs, but instances where arbitrary reductions from retail values have been made because of the desire to provide for depreciation and obsolescence with no actual offering to the public of the goods on which the mark-downs were claimed, cannot be recognized. Under no circumstances will a store be allowed to depreciate its stock in any way except by the offering of it to its customers at such reduced prices. The procedure of stores in regard to mark-downs will be deemed proper if in any fiscal year or period of that year the goods so marked down are in proportion to current sales, to stock on hand, to mark-downs of preceding months of preceding year, or if evidence can be submitted as to market changes which have forced a reduction in retail prices necessary to bring about a parity with the selling price of the same goods which have been purchased or could be purchased at a reduced cost.

In conclusion it should be noted that a store which has employed its retail method in the past, may now specify in the return that such method is used, as a basis on valuing inventories, regardless of the fact that in past years it reported on a "cost" or "cost or market whichever is lower" basis. However, the use of the retail method will not be recognized unless it has been correctly followed through the entire fiscal or calendar year period for which the return is made.

Respectfully,
(*Signed*) Wm. M. Williams,
Commissioner.

Treasury Decision 3296.—This decision dated Mar. 3, 1922, amending as it does those articles applicable to inventories, involves the "Inventories of Retail Merchants" (Art. 1588). The principal intent of this amendment, so far as the retail method is concerned and as is readily seen in paragraph 2 below, is to require that percentages of mark-up to retail be established for each department and used in the computing their respective inventory valuations, instead of the use of one average percentage for the entire business. That part of T. D. 3296 amending Art. 1588 states:

Retail merchants who employ what is known as the "retail method" of pricing inventories may make their returns upon that basis, provided that the use of such method is designated upon the return, that accurate accounts are kept, and that such method is consistently adhered to

unless a change is authorized by the Commissioner. Under this method the goods in the inventory are ordinarily priced at the selling prices, and the total retail value of the goods in each department or of each class of goods is reduced to approximate cost by deducting the percentage which represents the difference between the retail selling value and the purchase price. This percentage is determined by departments of a store or by classes of goods, and should represent as accurately as may be the amounts added to the cost prices of the goods to cover selling and other expenses of doing business and for the margin of profit. In computing the percentage above mentioned, proper adjustment should be made for all mark-ups and mark-downs.

A taxpayer maintaining more than one department in his store or dealing in classes of goods carrying different percentages of gross profit should not use a percentage of profit based upon an average of his entire business, but should compute and use in valuing his inventory the proper percentages for the respective departments or classes of goods.

Income Tax Mimeograph No. 3077.—The last important reference to the "retail method" on the part of the Bureau is Income Tax Mimeograph No. 3077, dated Mar. 23, 1923. In this communication, from the Commissioner to Collectors of Internal Revenue and others concerned, further explanation is given with respect to the scope of matters set forth in Art. 1588 and in the amendment to Art. 1588 contained in Treasury Decision 3296 (Mar. 3, 1922). This mimeograph letter which is reprinted here is deserving of careful study.

INCOME TAX MIMEOGRAPH NO. 3077

March 23, 1923

Inventories of Retail Merchants

Attention is invited to the provisions of Treasury Decision 3296, amending Article 1588 of Regulations 45, and to Article 1588, Regulations 62, dealing with the "retail method" of pricing inventories. Numerous inquiries have been made with respect to the scope of the article and accordingly this mimeograph is issued with a view to explaining some of the questions most frequently arising. Article 1588 provides that any retail merchant may employ the "retail method" of pricing inventories provided that the use of such method is designated upon the return, that accurate accounts are kept, and that such method is consistently adhered to. If a taxpayer elects to change from the "cost" or "cost or market" basis to the "retail method," such method will not be recognized unless it has been regularly followed and records properly kept through the entire accounting period for which return

is made. The "retail method" is essentially a cost method of valuing inventories, but the rule is not inflexible. On a constant or rising market, it is approximately a "cost" method, but on a falling market it may result in a reduction to "cost or market, whichever is lower." The provisions, of the regulation providing that accurate records must be kept, contemplates that certain records shall be kept by departments in permanent form for the inspection of internal revenue officers. Purchase records should show the firm name, date of invoice, invoice cost, and retail sales price. A permanent record should also be kept of the accumulation of all department purchases, mark-downs, sales, stock, etc.

Under the retail method the goods in the inventory are ordinarily priced at the selling prices, and the total retail value of the goods is reduced to approximate cost by deducting the percentage which represents the difference between the retail selling value and the purchase price. In order to compute this percentage properly goods should be recorded by departments at two prices: (*a*) invoice price plus transportation, and (*b*) original retail price. The total purchase mark-up for the accounting period is the difference between

Cost: Inventory at the beginning of the period.
Purchases at cost.
Transportation.
and
Retail: Inventory at sales price.
Purchase at sales price.

This total mark-up, divided by the total retail value will give the percentage of purchase mark-up. Under no circumstances should arbitrary standard percentages of purchase mark-up be used, but such percentage must be the mark-up percentage computed as accurately as possible from the department records of the accounting period for which the return is made.

The article also provides that, in computing the percentage above mentioned, proper adjustment should be made for all mark-ups and mark-downs. This means mark-ups and mark-downs with respect to original retail price. It contemplated that it is proper to add in computing the percentage as a part of the original retail sales price the actual increase in such price which has been brought about by market conditions and by incorrect pricing when the goods were put into stock. For the convenience of the examining officer, a special form should be provided in which complete information by items of the increase from the original retail should be shown and reference, if possible, made to the original invoice and entry, and the reason for the increase freely explained. Entry of such increased retail properly belongs in department purchase books, although it may be set up

as a separate item in the accumulated records of the department. The same forms that are used to record such price increases should not be used for mark-downs and in no instance will a store be allowed to include as retail increases a mark-up which has been taken as a correction or cancellation of a mark-down; such mark-up must be regarded and treated in all cases as opposite to mark-downs.

With respect to mark-downs, these will be recognized where the procedure is proper and consistent. The procedure with regard to mark-downs will be deemed proper if in any fiscal year or period of that year the goods so marked down are in proportion to current sales, to stock on hand, to mark-downs of corresponding months of the preceding year, or if evidence can be submitted as to market changes which have forced a reduction in retail prices to bring about a parity with the selling price of the same goods which have been purchased at a reduced cost. Arbitrary mark-downs made to provide for depreciation and obsolescence of goods in inventory will not be recognized. Mark-downs made for this purpose will be allowed only by actual offering of the goods to the public at such reduced prices.

It is recognized that where, in changing from the cost method of computing inventories to the retail method, the opening inventory is not computed at retail, a book profit results for the year in which the change is made which is clearly not income realized from operations, or gain within the meaning of the Revenue Acts and which need not therefore be included in the income for the year, provided the taxpayer has kept accurate records showing such unrealized income and in filing the return the items are clearly set up in a rider attached to the return. (IT: Mim. Coll. No. 3077, signed by Commissioner D. H. Blair, and dated March 23, 1923.)

One matter in this letter is deserving of more than passing attention. It is with respect to book profits which are unrealized in changing from the cost method of computing inventories to the retail method. The last paragraph of this letter is entirely devoted to this matter. The recognition of this matter and its disposition of the bureau in the manner described in that paragraph removes a most troublesome obstacle in the way of retail inventory method adoption.

While not so in every case it has happened that many concerns in changing from the cost method to the retail method during an operating period, have shown ficticious book profits which have arisen as a result of this change. Since these concerns were naturally unwilling to be taxed on income which had not been actually earned, they hesitated in changing to the retail method. The Bureau's recognition that no taxable income arises as a result

of this procedure has paved the way for a more general acceptance of the retail method on the part of those concerns, who, for the reason stated above, were hesitant in adopting it.

Retail Inventory Method Forms.—The sundry forms and records necessary to the successful operation of the retail method, and the principal information these same records must contain, are based hardly without exception, upon what is required by the Federal authorities for tax purposes. In design and in minor details, however, the forms of one retailer rarely agree with those of another. Since the government exerts such weighty influence in connection with these records, it is necessary that a careful reading be made of all matters with respect to the retail method so far as taxes are concerned, in order that it may be known exactly what is required.

According to the Treasury Decisions and tax letters reprinted in the preceding pages, the Bureau of Internal Revenue requires the following records from those who price their inventories by the retail method:

1. Record of Purchases—Cost and Retail by departments.
2. Record of Mark-downs—by departments.
3. Record of Mark-down Cancellations—by departments.
4. Record of Additional Mark-ups—by departments.
5. Record of Additional Mark-up Cancellations—by departments.
6. Record of Sales at Retail—by departments.
7. Record of Physical Inventory at Retail—by departments.

Record of Purchases—by Departments.—This record can be the purchase journal or voucher register, whichever is used, provided such record allows for distribution columns which show not only the invoice cost by departments but also the retail selling price of the same invoices by departments. Or if columnar distribution on the voucher register is impracticable by reason of too great a number of departments, this record may be designed to show both the invoice cost and the retail selling price, with a reference made to the departments to which chargeable. At the end of the month a recapitulation by departments may be drawn off on analysis paper, and summarized.

It is to be noted that the term "purchases," when referred to in connection with the determination of the average per cent of mark-up, means *net purchases; i.e.*, gross purchases less returns and allowances.

Record of Mark-downs.—According to the tax regulations this record is required to furnish the following information: description of the merchandise, reason for the mark-down, the date, original retail price, new retail price, the difference between the original and new retail prices, and a reference to the original invoice on which the goods were purchased—if this can reasonably be done. Since the regulations require the maintenance of separate percentages of mark-up to retail for each department, it is necessary that a record of mark-downs for each department be maintained. The form which follows is an example of such a record.

DATE Feb. 3, 1923 — MARK DOWN RECORD — PAGE NUMBER 45

DEPARTMENT Men's Clothing

REQ. NO.	ARTICLE	REASON	QUAN.	UNIT	PRESENT RETAIL	PROPOSED RETAIL	DIFF.	UNIT COST	EXTENSION DIFF × QUAN
543	Overcoats #1511,72,78	Priced too high	3	ea	65 –	55 –	10 –	40 –	30 –
544	Suits (Sack) #782,913								
	927, 931, 950	Pattern	5	ea	50 –	45 –	5 –	25 –	25 –
545	Dress Suits #601	Style	1	ea	95 –	80 –	15 –	50 –	15 –
		TOTAL							70 –

SIGNED BY — BUYER: R. Arstein — MDSE. MGR.: Wm Miller

Fig. 37.—Mark down record.

In this connection further attention is directed to Fig. 38. This form, known as a mark-down requisition, originates in a selling department. It is a means by which the buyer for a department requests approval from the merchandise manager of a mark-down which the buyer considers necessary. When approved, this form is the authority required by the marking room before it may reprice the merchandise. Usually three copies of this form are made; the first goes to the marking room; the second goes to the general accounting office where it is posted to the Record of Mark-downs; the third is retained by the buyer who originated the requisition.

Record of Mark-down Cancellations.—This form should be similar to the record of mark-downs except that an additional column should be included which will permit the registration of the number of the mark-down requisition which originally authorized the price change, provided that this can readily be done.

DATE	MARK-DOWN REQUISITION	NO.
Feb. 3, 1923		543

DEPARTMENT: Men's Clothing

DESCRIPTION OF ARTICLE:

Overcoats
#1571
1572
1578

REASON FOR MARK-DOWN

X	PRICED TOO HIGH		ODD SIZE
	OVERSTOCKED		MATERIAL POOR
	DAMAGED		POOR STYLE
	COMPETITION		PATTERN
	LEADERS		OTHER

OTHER:

PRESENT RETAIL	PROPOSED RETAIL	DIFF.	UNIT COST
$65	$55	$10	$40
UNIT	**QUANTITY**	**EXTENSION**	
Ea.	3	$30	

SIGNED BY	APPROVED BY
B. Arshein	J. B. Williams
BUYER	MERCHANDISE MGR.

SEPARATE REQUISITION FOR SEPARATE ITEMS OF MERCHANDISE.

FIG. 38.—Mark-down requisition.

Because of the similarity between these two forms it is not necessary to show the Record of Mark-down Cancellations here.

The means for requesting a mark-down cancellation on the part of a buyer may be not unlike the mark-down requisition referred to previously. This requisition is the medium by which postings are made to the Record of Mark-down Cancellations.

Record of Additional Mark-ups.—This form is self-explanatory. If this record is compared with the requirements of the Bureau it will be seen that every necessary feature has been considered. The medium used for posting may be designed on the order of the mark-down requisitions. It may be called a "Requisition for Additional Mark-ups."

DATE May 28, 1923 — ADDITIONAL MARK-UP RECORD — PAGE NUMBER 37

DEPARTMENT Men's Clothing

REQ. NO.	ARTICLE	REASON	QUANTITY	UNIT	PRESENT RETAIL	PROPOSED RETAIL	DIFF.	UNIT COST	EXTENSION DIFF. X QUAN.
617	Suits - Fancy L.W.	Increased Cost	2	ea	50 -	57 50	7 50	32 50	15 -
618	" - Blue	" "	3	ea	65 -	70 -	5 -	40	15 -
		TOTAL							30 -

SIGNED BY — BUYER: B. Arakerin — MDSE. MGR.: Wm. Miller

Fig. 39.—Additional mark-up record.

Record of Additional Mark-up Cancellations.—The relation of this record to the one above is the same as the relation of the Record of Mark-down Cancellations to the Record of Mark-downs. In design and details then, the Record of Additional Mark-up Cancellations should be similar to the Record of Additional mark-ups. The result sought by this form is the amount of additional mark-ups that have been canceled in each department during each month.

Record of Sales at Retail.—No special comment need be made with respect to this record since a sales book is all that is required. Provided of course, that such sales book is so arranged as to give total monthly sales by departments. It is to be noted that sales, when referred to in connection with the determination of the average per cent of mark-up, means *net sales, i.e.*, gross sales less returns and allowances.

Record of Physical Inventory at Retail.—The amount of information required in connection with the inventory of a retail

concern does not differ to any marked degree from information required of other inventories. A complete description is necessary; the quantity must be given; the unit of measure and the unit price are needed; and the extention of the quantity by the unit price calculated and included.

Record of Transfers between Departments.—From time to time merchandise originally charged to one department may later be transferred to another department. Such a transaction requires that the department surrendering the goods be credited and at the same time the department receiving the goods be debited. Since these debits and credits affect the average per cent of mark-up in the respective departments it is necessary that a complete and accurate record by both retail and cost be kept of all transfers. A form on which all transfers may be registered is sometimes called the Record of Department Transfers. This form, with possible exceptions in instances of the very largest retail concerns, may generally be designed as a monthly summarizing form. Under this arrangement no entries are made on the form until the end of each month. At that time all departmental transfer authorizations are sorted and summarized, and the totals posted to the respective departments. The total of the credits to all departments should equal the total of all charges.

One matter in connection with transfers seems deserving of comment at this point. When merchandise is transferred, it is credited and charged at its retail price and *actual* cost, or at a cost established by applying the complement of the average mark-up, then prevailing in the department to the retail price. The actual cost can be obtained either from the price tag attached to the merchandise (it appears thereon in the form of a code) or from the stock records if such are in use.

Average Per Cent of Mark-up—by Departments.—Prior to the inception of the retail method, at least prior to the time when it received its present name, quite a number of retail establishments computed their gross profits each month by applying one average per cent of mark-up to the net sales for the month. This one average per cent was established for the concern as a whole. No consideration was given to departmentalizing the store physically or by classes of merchandise. Only one average per cent of mark-up was established each month, and each dollar of sales, whether of a class of merchandise bearing a low

mark-up or whether of another class bearing a high mark-up, was assumed to gross the same amount of profit. Under such a method, especially where the mark-up per cents of merchandise varied considerably, results were bound to be obtained which differed in no small degree from actual facts.

This was really an averaging method in principle not unlike the present retail method, which is also an averaging method, but the averaging was done on too broad a scale. The application of the average was also too broad. The author recalls that some years ago while engaged in doing certain accounting work for a medium-size dry goods concern, he entered into considerable discussion with the client in connection with the latter's use of one monthly average per cent of mark-up. The discussion started when it was pointed out to the retailer that he was applying the same average per cent to *all* sales for the month of July in order to establish his gross profit figure, when as a matter of fact most of the sales as shown by the records had been made from those departments where the actual mark-up percentages were much lower than the average for the store as a whole. The client's answer, while quite logical under certain conditions, can hardly be called good accounting. He said, "Granted that in some months my estimate of gross profits, cost of goods sold, and inventory on hand, may be too great or too little by reason of my using only one average per cent of mark-up for the entire store. However, if perchance a larger proportion of low mark-up goods are sold in one month than is ordinarily sold, and the gross profits show to be a little greater than they really are, you must remember that I have got to replace that low mark-up merchandise in the following month. What is the result? When those purchases come in they will push the average per cent down. And this new average per cent applied to subsequent sales makes the gross profits a little less than they really are. So you see it all averages up in the long run."

Whether it does "all average up in the long run" is a matter which is open to serious question. In this special case, however, the client took his annual inventory on the basis of cost and was thus able to determine his true profits for the operating period as a whole, although month by month he may have been misled as to his individual monthly profits computed by means of but one average mark-up per cent.

Since the acceptance of the retail method for tax purposes in so far as the pricing of inventories is concerned, it hardly justifies a merchant to adopt the attitude that "it all averages up in the long run." Especially so since he may find himself penalized in more ways than one. To avoid the pitfalls which accompany the having of but one average per cent for the concern as a whole, a method is now employed whereby the store is departmentalized either physically or by main classes of merchandise. The idea back of such departmentalizing is to group together and maintain average mark-up per cents for each department on the theory that the actual per cents of mark-up on the individual items of merchandise in a department do not vary greatly from the departmental average. While this later viewpoint may not coincide with actual conditions in many instances, yet the improvement of this method over the old method, in so far as rendering the average per cent more accurate is concerned, cannot be denied. Under this method the average per cent of mark-up is established for each department and these percentages are used for the period to which they are applicable. This period may be every week or every month, depending upon what minimum period it is decided to adopt.

The thought to be derived from the above paragraphs is: first, that the use of one average mark-up per cent for the store as a whole is undependable, leads to serious errors, and is not acceptable under the present retail method; second, that the store should be departmentalized physically or by main classes or sub-classes of merchandise and an average per cent of mark-up should be maintained for each of these respective departments.

Cumulative Versus Individual Totals in Determining Average Per Cent of Purchase Mark-up.—Because the retail method is an averaging method it is subject to the same kind of errors which may result from the use of any average figures. The averaging feature in the retail method pertains to the per cent of mark-up to retail. While this figure like other average figures may lead one into serious error from time to time, it is possible to minimize this possibility by the adoption and use of certain methods. The first of these methods whereby a separate average per cent is maintained for each department instead of but one general average per cent for the concern as a whole, has already been explained.

An additional precautionary method is now to be considered. This method concerns itself with the period of time within which

the factors used in establishing the average per cent of mark-up, are to be computed. Let the following figures be assumed.

	Cost	Mark-up	Retail	Per cent of mark-up to retail
Jan. 1 (Inventory)	$12,000	$4,000	$16,000	25
Purchases in January	10,500	4,500	15,000	30
Amount of Merchandise Handled	$22,500	$8,500	$31,000	27.4

The sales during January are $10,000 at retail.

Based on these figures the cost of sales during January is $7,260 (the complement of 27.4 per cent multiplied by the sales, $10,000) and the gross profit $2,740. As an actual fact however, all purchases during January were received during the last three days and none of this merchandise was sold because it was not put in stock until February first. Actually then, the cost of sales is $7,500 and the gross profit $2,500. The difference between these two figures is easy to trace down. In the first place the average per cent has been raised by the receipt of a large amount of purchases with higher average mark-ups; and also, the average per cent 27.4 per cent although the average for the amount of merchandise *handled* during January, is not in actual fact the average mark-up for the merchandise sold. It is not difficult to see that by use of the average per cent the gross profit in January is too great and the profits in February and following months too small.

If the purchases had been low mark-up merchandise just the opposite would have resulted, and the gross profits shown by the average per cent method would have been less than the actual gross profits. No other factor of the retail method affects the average per cent of mark-up to the extent that purchases affect it. In fact the amount of purchases at cost and retail is the only factor that has any marked effect upon the average per cent. The conclusion to be drawn from the above remarks then may be briefly stated as follows: *Under the retail method heavy purchases of merchandise, which taken as a whole have been marked up above or below the prevailing average per cent, may affect that per cent to*

the extent that results obtained by its use in calculating profits and inventory for a certain period are incorrect and unreliable.

Since, as previously explained, purchases made in one period may decidedly affect the amounts shown to be gross profit, the inventory, and the average per cent of mark-up (although actually it may be the case that such purchased merchandise is not sold until subsequent periods), some means should be availed of to control unreasonable fluctuations of the average per cent caused by reason of such purchases. The best way to avoid marked fluctuations in average per cents of mark-up is to take the figures which make up the factors of the dividend and division over a longer period of time. The longer the period the more correct the average. The final results for example, of determining the average number of automobiles that pass a certain point each hour will be more correct the longer the number of hours given to the survey. In this case as in other cases, however, the period of time must be limited, for beyond a certain period of time no real advantage accrues in making the result more accurate. The question then, applicable to the present subject, is for what period should the average per cent of mark-up be calculated and applied—a day, a week, a month, six months a year?

It is perhaps the most common practice to compile figures and compute the average per cent of mark-up on the basis of *monthly* totals of purchases and other inventory additions, although many firms keep their figures on a weekly basis and compute their average per cent of mark-ups on a cumulative weekly basis, a method explained in following paragraphs.

The expression "monthly totals," however, may refer to either of the following:

1. Individual monthly totals.
2. Cumulative monthly totals.

Under the "individual monthly total" basis each month is considered as a period distinct from other months. To the inventory at cost and retail carried forward from the preceding month are added purchases and other inventory additions during the month in question. Based on these figures, the average per cent of mark-up for the particular month is established and applied to sales. Thus the gross profit and cost of sales for the month, and the closing inventory at cost and retail are deter-

mined. The same procedure is adopted in the next month, and so on. The form and figures below illustrate this basis.

CASE I

(Illustrating "Individual Monthly Totals" *Retail Method*)

Items[1]	Cost	Mark-up	Retail	Per cent of mark-up to retail
Inventory, Jan. 1	$12,000	$ 4,000	$16,000	25
Purchases in January	10,500	4,500	15,000	30
Amount of Merchandise Handled	22,500	8,500	31,000	27.4
Sales in January	7,260	2,740	10,000	27.4
Inventory, Feb. 1	15,240	5,760	21,000	27.4
Purchases in February	15,000	5,000	20,000	25
Amount of Merchandise Handled	30,240	10,760	41,000	26.2
Sales in February	14,760	5,240	20,000	26.2
Inventory—Mar. 1	$15,480	$ 5,520	$21,000	26.2

[1] Mark-downs, transfers, etc. have been intentionally omitted in order to give a clearer presentation of the principles involved.

Under the "cumulative monthly total" basis, the figures applicable to the current month's transactions are added to the total figures of *all* previous months in the period and the average per cent of mark-up calculated for the entire period; *i.e.* from the commencement of the operating year to and including the current month. Applying this average per cent to total sales for the period of the operating year already expired is the means for establishing not only gross profits but also the cost of merchandise inventory on hand. If, for example, the current month is April, then to the amount of purchases and other inventory additions for that month would be added the total of all purchases and other inventory additions for January, February and March. These totals accumulated at both cost and retail and taken with the opening inventory allows the establishment of the average per cent of purchase mark-up applicable to the entire period of four months.

It is not uncommon for retail concerns to accumulate their transactions weekly and establish new average per cents of mark-up

at the end of each week for the calculation of profits *during* that week. In this matter, however, it is to be remembered that as these weekly average per cents of mark-up are the results of cumulated totals (including all past weeks in the period) a per cent established for the second week exists for that week only, because transactions of the third week will not only effect a different average per cent for the third week, but will also make that per cent applicable to all previous weeks. Hence, under the weekly as well as the monthly cumulative plan, average per cents are only tentatively established for the time being, to be corrected eventually to the one general average over the entire period. The principles governing the cumulative monthly plan also govern the cumulative weekly plan.

With reference to the monthly plan and making use of the same figures as given in Case I, the average per cent of purchase mark-up under the cumulative plan for February and January is determined in the following manner:

CASE II

(Illustrating "Cumulative Monthly Totals" *Retail Method*)

Items	Cost	Mark-up	Retail	Cumulative totals			
				Cost	Mark-up	Retail	Per cent of mark-up to retail
Inventory—Jan. 1	.....	.....	.....	$12,000	$ 4,000	$16,000	25
Purchases—January	$10,500	$4,500	$15,000				
Purchases—February	15,000	5,000	20,000	25,500	9,500	35,000	27.1
Amount of Merchandise Handled	.....	.....	.....	$37,500	$13,500	$51,000	25.5
Sales—January	.....	.....	$10,000				
Sales—February	.....	.....	20,000	22,350	7,650	30,000	25.5
Inventory—Mar. 1	.....	.....	.....	$15,150	$ 5,850	$21,000	25.5

A comparison of this case with Case I will show that whereas the average per cent at the end of February in one instance is 26.2 per cent, it is 25.5 per cent in the other instance. Applying the complements of these percentages to the retail inventory ($21,000 in both cases) gives cost inventories of $15,498 and $15,645 respectively.

Of these two bases, the individual and the cumulative monthly totals, the former is the one more generally in use *during* the

operating year. Although results from its use are less accurate than results from the latter, the figures are close enough for administrative and merchandise control purposes. At the end of the operating year, however, when it is necessary that the annual physical inventory at retail prices be correctly reduced to cost for computing profits, the average per cent of purchase mark-up for the last month in the operating year, as would prevail under the individual monthly basis, should not be used. Instead, the average per cent of purchase mark-up to be applied against the annual physical inventory at retail should be established by means of the cumulative basis for the entire twelve months. This means that but one average per cent is to be established for the operating period as a whole, and that one average per cent is to measure the amount of mark-up in the annual inventory at retail. Under this method the total amount of purchases and other inventory additions, at cost and retail, for the entire year are added to the opening inventory, at cost and retail, and the per cent of purchase mark-up determined by dividing the total retail into total mark-up.

Merchandise Purchases—Gross or Net.—Although, as previously stated, the general principles of the retail method of inventory are grasped without a great deal of difficulty, the problems which arise in connection with the details of those principles are many, and require careful consideration and study if the results sought for are to be obtained. Purchases, for example, appear in the form of arrangement for the retail method as being an amount to add to the opening inventory, both at cost and retail. Whether purchases should be taken in and charged to the various departments at gross (invoice face amount) or at net (invoice face less cash discount) must of course be decided, for otherwise certain differences may later arise to affect the inventory and profits. Of these two, gross or net, perhaps the one more generally in use is the method of charging merchandise into the accounts at *gross*. Many stores, however, charge their merchandise in at net.

Charging-in merchandise at gross or at net, especially in view of the fact that the selling price is usually the same in either case, makes a difference not only in the *amount* of mark-up but also in the *per cent* of mark-up. In the first place if invoices are charged in at *net* the mark-up will be higher than if charged in at *gross*. This is so because the discount in the first instance (net)

is included in the mark-up. As a result a proportionate part of the discount is earned each time a sale is made. Under the gross method on the other hand, the invoice is charged in at invoice face amount, any discount being ignored for purposes of the retail inventory method but instead taken in a separate earning account.

Under the *net* method discounts are earned as sales are made; under the *gross* method discounts are taken in as earnings at the time of invoice payments without regard as to whether or not the merchandise has been sold. To equalize profits under the gross method, however, a reserve for cash discounts may be created at the end of the fiscal period. This reserve representing the amount of cash discounts being carried in the inventory, and computed by use of the average per cent of discounts during the period, has its complement entry as a charge to the "Earned Discounts" account. The entry of the reserve (credit) to "Earned Discount" account (debit) may be reversed at the beginning of the next period. The following figures make possible a comparison between the results of each method.

Given: (*a*) A quantity of merchandise is purchased at an invoice cost (gross) of $250. The discount taken on this invoice is 6 per cent, or in amount, $15. The *net* then, is $235.

(*b*) This merchandise is marked up to sell for $375.

(*c*) During the operating period the retail sales amount to $300.

Under the Net Method:

	Cost	Mark-up	Selling price	Per cent of mark-up to retail
Invoice	$235	$140	$375	37⅓

Sales	$300
Less: Cost of Goods Sold ($300 × 62⅔ per cent)	188
Gross Profit	$112
Purchases (at net cost)	$235
Less: Cost of Goods Sold	188
Inventory (at net cost)	$ 47

ACCOUNTS

Inventory	
250	15
	188
	47
250	250
47	

Accounts Payable	
250	250

Cash	
300	235

Discount	
15	15

Cost of Goods Sold	
188	188

Sales	
188	300
112	
300	300

Profit and Loss	
	112

Under the Gross Method:

	Cost	Mark-up	Selling price	Per cent of mark-up to selling price
Invoice	$250	$125	$375	33⅓

Sales	$300
Less: Cost of Goods Sold ($300 × 66⅔)	200
Gross Profit	$100
Purchases (at cost—gross)	$250
Less: Cost of Goods Sold	200
Inventory—at gross cost	$ 50
Less: Reserve for Cash Discounts in inventory ($50 × 6 per cent)	3
Actual Cost of inventory on hand	$ 47

ACCOUNTS

Inventory	
250	200
	50
250	250
50	

Accounts Payable	
250	250

Cash	
300	235

Discounts Earned	
3	15
12	
15	15

Cost of Goods Sold	
200	200

Sales	
200	300
100	
300	300

Profit and Loss	
	100
	12

Reserve for Cash Discounts	
	3

On the balance sheet the reserve for cash discounts would show as a deduction from the gross inventory and the net figure carried into the valuation column.

Comparison between "Gross" and "Net" Purchases.—The figures given above very clearly show in what way the figures of one method differ from the other although the net result of each, both in value of inventory and in profits shown, agree. The principal differences, however, are important enough to deserve special comment.

1. *Per Cent of Mark-up.*—The per cent of mark-up under the *net* method is greater than under *gross*.

2. *Cost of Goods Sold.*—As the per cent of mark-up is greater under *net* the cost of goods sold will necessarily be lower than under the *gross* method.

3. *Gross Profit.*—Under the *gross* method, the gross profit shows the profit from sales alone, and does not include the earnings from discounts. The contrary is true under the *net* method.

4. *Reserve for Cash Discounts.*—No reserve is necessary under the *net* method for the simple reason that since discounts are included in the mark-up therefore the net cost of the inventory is automatically established when the complement of the mark-up per cent is applied to the retail inventory amount.

Under the *gross* method the mark-up does not include the discount. Hence when the complement of the mark-up per cent is applied to the retail inventory the result is not net cost of the inventory on hand. A certain part is unearned discounts which must be offset by a reserve established for that purpose.

Comments by an Authority.—During the 1923 convention of the Controllers' Congress of the National Retail Dry Goods Association, considerable discussion was given to the subject of charging invoices at gross or net. Among the comments made at that time perhaps none were more clearly and concisely stated than those made by Jay Iglauer of The Halle Company, Cleveland, Ohio. Extracts of which are reprinted here. Mr. Iglauer at that time said:

. . . it seems to me that the problem here is one of policy rather than possible accuracy of accounting. I think it will be borne out by tests that the net return will be the same, as far as the net income from your business is concerned. That the policy of taking discount before it is entered, or the policy of entering anything gross with the discount appearing as a separate item, will not influence the net result so far as

the accounting problem is concerned. Now, if that be true—and I think it can be shown satisfactorily to the Government that it is true—there is no real argument as to which of these methods is the correct one, provided that method is consistently followed from one year to another. . . . To overcome that, we took the average cash discounts from the face of the inventory, to create a reserve for cash discounts, and then continued to enter our invoices gross throughout the year. Anyone who has been in the habit of doing one or the other, and wants to change, must perform an operation like that in order to avoid paying the Government too much or too little money. So that, in my opinion, the method consistently followed from year to year results in the same net profit either way, and you must be governed, therefore, by questions of policy rather than of accounting.

Concerning the question as to whether or not deductions from the inventory on account of cash discounts as is done under the *gross* method by means of a reserve conflicts with any ruling of the tax law, Mr. Iglauer stated that

. . . I do not agree that the reduction of the discount comes under the ruling of the Department, which forbids the deduction of arbitrary percentages. It is perfectly true that the Government does not permit deduction of arbitrary percentages for the revaluation of the inventory. But the question might be very debatable, though I am satisfied that we would have no difficulty in establishing it, that the deduction of a discount, known to have been a regular discount granted to that department by the manufacturer and shown to be an average discount, could be deducted from inventory at the end of the year in order to reflect the true cost of the goods represented in that inventory. It is a question of "What is cost?" Is the cost of the invoice face value the actual cost, or is the cost to you the face of the invoice less whatever cash discounts are granted?

For convenience of operation, we may prefer to enter our invoices against the department at the gross figure and make our adjustments at periodical times, such as we do at semi-annual and annual periods; or we might do as Mr. Hunter does enter the invoices net as they come in. Personally, I prefer to enter the invoices gross, because we give the departments credit for all of the discounts they earn, including the anticipation. The anticipation must necessarily vary from day to day, and, inasmuch as that does vary, you cannot take it off your invoice until you know how soon you are going to pay it. That is one of our reasons. The other reason is this: I am satisfied that the Government can be shown, if they raise that question, that the deduction of average cash discounts, known to be the overage, from the inventory at the end of the period is a perfectly legitimate procedure, providing it is followed from year to year.

Effect on Mark-up Percentage of Goods Purchased for Special Sales.—It is not unusual from time to time for concerns to purchase merchandise for a special sale, and to mark such merchandise at prices which have a very much lower per cent of mark-up than is usually the average for regular goods in the particular department. As these special sales goods are purchased to be sold within a few days' time, and since the retail method is a system of averages, the result of considering this class of merchandise as regular purchases, and including cost and retail in the figures establishing the average mark-up per cent is to lower that percentage. The effect is three fold.

First: The profits from the sale of the special sale merchandise are shown to be greater than really is the case. This is so because although the department average mark-up is reduced by the inclusion of the low priced goods, still such reduced average mark-up is higher than the actual mark-up of the special sales merchandise, and applying such department average to the sales results in showing greater profits than have actually been earned.

Second: Profits on regular goods subsequently sold are shown to be lower than actually is the case and subsequent months are made to bear the burden of reduced profits.

Third: An inventory taken at a later date by the retail method will show an amount much in excess of the actual cost. This, of course, is due to the taking off of a mark-up percentage much smaller than the actual mark-up.

Only when the amount of this kind of merchandise and the sale thereof is large enough to cause a substantial reduction in the departmental average mark-up (and it is generally held that it does not) need any consideration be given as to the treatment of the purchases, both at cost and retail. This is so for the reason that the retail method of inventory is based on averages, the average mark-up being the resultant of a great number of individual mark-ups some of which are larger and some are smaller than the average. If exceptions are to be made in each case where the individual mark-up per cent of an article is at variance with the average mark-up per cent the whole scheme of the retail method falls flat.

In some cases, however, the volume of special sales in which merchandise of a low mark-up is sold is so considerable that methods have been devised to keep the regular departmental average per cent free from fluctuations caused by these sales.

Of various methods in use the following two may be said to be the more generally acceptable.

1. *Pricing Special Sales Merchandise at the Average Mark-up and Taking Mark-downs to Establish Actual Selling Price.*—This method requires that invoices covering special sales merchandise be taken in at cost and at a retail price which is established by use of the departmental average mark-up. Mark-downs necessary to set the actual selling prices are then taken and since these mark-downs are charged in the month in which taken, subsequent months do not bear the burden.

2. *Special Sales Merchandise Considered as a Subclassification of a Department and Having Its Own Average Mark-up Per Cent.*—This method is considered by many as the most practicable when the special sales goods are kept separate and not mingled with regular merchandise. Although it may take some stretch of imagination to class special merchandise as a sub-department in order than an average mark-up may be established for this class of goods, yet it can be done for the purpose of accomplishing the results sought, *i.e.*, not to disturb the regular department mark-up percentage. To adopt and use this method then requires first, that special sale goods be set up as a sub-department and records applicable thereto be maintained in the same manner at any other department; and second, that average mark-ups be established and used for the same purpose as other mark-ups under the retail inventory method.

Inventory Discrepancies and Reconciliations.—The physical inventory amount invariably differs from the book inventory figure. This difference, with possibly few exceptions, is in favor of the book inventory, that is, the physical inventory shows the smaller total. If this difference is comparatively small it is not necessary to question the matter, and an adjusting entry may be made to bring the book inventory into agreement with the physical inventory. On the other hand should the amount of difference be large, an inquiry and investigation should be commenced to trace down the cause or causes thereof before any adjustments should be made.

The first thing to do when the inventory difference requires investigation is to check the physical inventory summaries and original inventory sheets for errors in totals, extentions, prices and quantities. If after this work has been accomplished no marked reduction has been made in the difference, all *total* figures and calculations used in establishing the book inventory by the retail method should be checked back to the supporting records. The difference, still too large to permit of adjusting,

may now necessitate the retaking of the physical inventory in those departments which the figures show as chiefly responsible for the large discrepancy. Some of the principal errors of omission and commission which may have arisen during the original inventory are as follows:

1. Wrong quantity as a result of poor calling.
2. Incorrect pricing.
3. Merchandise omitted from the inventory.
4. Merchandise included more than once.
5. Intentional "padding" of inventory.
6. Incorrect description resulting in incorrect pricing.
7. Incorrect unit of count resulting in incorrect pricing.
8. Including capital assets in the inventory.

Let it now be assumed that the inventory has been retaken and no appreciable reduction has been occasioned in the discrepancy. The next step then is to make a detailed check of the supporting records in order to verify the book inventory. Principal among the errors in the records the following will be found:

1. Failure to have the opening inventory in agreement with the last physical inventory.
2. Failure to charge the book inventory with all invoices payable.
3. Failure to credit book inventory with all goods sold or otherwise disposed.
4. Charging invoices to departments but not including merchandise in the inventory. (Goods in transit for example.)
5. Charging invoices to a department other than the one receiving the merchandise.
6. Giving credit to the wrong department for merchandise returned to vendor because unsatisfactory. Also omitting to credit any department.
7. Incorrect reporting and distribution of sales, sales returns, etc.

Under the retail method differences are often caused by the use of incorrect average per cents of mark-up in conjunction with correct retail prices, or, on the other hand, the use of correct average per cents of mark-up in conjunction with incorrect retail prices. Both of these two matters are deserving of careful consideration.

1. *Incorrect Average Per Cents of Mark-up Are Caused by:*

a. Failure to have opening inventory in agreement with last physical inventory—cost and retail.

b. Incorrect posting of purchases at cost and retail.

c. Incorrectly posting, or failure to post, all items applicable to additional mark-ups and additional mark-up cancellations.

d. Errors in the calculations necessary to establish the average per cents of mark-ups.

e. Establishing the average per cent of mark-up for too limited a period.

2. *Incorrect Retail Prices Are Caused by:*

a. Marking merchandise with different prices than those placed on invoices.

b. Failure to remark merchandise or to remark it correctly with all authorized additional mark-ups and cancellations, mark-downs and mark-down cancellations.

In case every reasonable attempt has now been made to trace down the discrepancy between the book and physical inventory figures and there still remains an unaccounted for balance, this difference may properly be said to be caused by a shortage in the merchandise itself. Exactly what has caused such a shortage may be difficult to determine. Generally, however, the greater portion of such merchandise shortages will be found to arise as a result of

1. Theft by customers.
2. Theft by employees in receiving room, storerooms, and selling departments.
3. Breakage and destruction of merchandise by customers and employees.
4. Misplaced and lost merchandise.
5. Giving customers a larger quantity or a better quality of merchandise than paid for.

Adjusting Book Inventory to Physical Inventory.—Adjusting or bringing the book inventory into agreement with the physical inventory at the end of an operating year is just as necessary under the retail inventory method as any other method. As previously explained, the physical inventory under the retail method is taken at retail or selling prices rather than at cost or market valuations. This, coupled with the fact that under the retail method the retail inventory method form is kept at cost and retail (the general ledger merchandise inventory account is, however, necessarily kept at cost) is sufficient information with which to commence a discussion of retail inventory adjustments. Let the following figures be assumed.

The retail inventory records of the A B C Company as of Dec. 31, 1923 show these figures:

	Cost	Mark-up	Retail	Per cent of mark-up to retail
Book Inventory 12/31/23....	$100,000	$50,000	$150,000	33⅓

The physical inventory taken as of Dec. 31 amounted, at retail, to $144,000.

It is quite apparent that the physical inventory at retail, is less than the book inventory at retail, by the amount of $6,000. Therefore the retail inventory records must be adjusted to the figures of the physical inventory. This is done by inserting the physical inventory retail figure under the retail book inventory as of Dec. 31, 1923, and computing the mark-up and the cost by use of the average per cent of mark-up already given. Applying 33⅓ per cent to the physical inventory amount of $144,000 gives a figure of $48,000—the amount of mark-up in the physical inventory figure. The cost therefore, is $144,000 minus $48,000, or $96,000. The corrected retail records will now appear in this way.

	Cost	Mark-up	Retail	Per cent of mark-up to retail
Book Inventory 12/31/23.....	$100,000	$50,000	$150,000	33⅓
Physical Inventory 12/31/23.....	$ 96,000	$48,000	$144,000	33⅓
Cost Adjustment.....	$ 4,000			

In the first paragraph it has been stated that a "Merchandise Inventory" account carried in the general ledger must necessarily be carried at cost. On this basis, and assuming that the general ledger inventory figures is kept in agreement with the inventory at cost on the retail inventory form, the general ledger inventory should be $100,000 as of Dec. 31, 1923, before adjustments.

However, this figure as the result of the physical inventory has been proven to be incorrect. Instead of $100,000 the general ledger account should be $96,000. An adjustment of $4,000 is now required to put the general ledger account into agreement with the physical inventory cost figure. This adjustment must necessarily be made by means of a journal entry crediting the "Merchandise Inventory" account and debiting the "Cost of Goods Sold" (or such other account or accounts as considered desirable). The journal entry would appear as follows:

Dec. 31, 1923

Cost of Goods Sold	$4,000	
Merchandise Inventory		$4,000

To record the necessary adjustment required to bring the ledger account into agreement with the physical inventory. Book inventory at cost $100,000; physical inventory at cost $96,000; difference $4,000.

It will readily be seen from the above that in the final analysis adjusting the book inventory to the physical inventory is no different in the case of the retail method than any other method. Although the inventory is taken at retail prices instead of at cost prices the total inventory at retail is reduced to cost figures by one calculation. From this point the operation of making the adjustment parallels the operation under other methods.

Advantages of the Retail Inventory Method.—The primary purpose of the retail inventory method is to establish inventory valuations currently and accurately. With such essential information readily available a great many advantages accrue, some more important than others, but all owing their worth to these inventory valuation figures. It is quite apparent from the comments which follow that much of the data which the retail method furnishes, directly or indirectly, could not be economically obtained by any other method.

Of the many benefits to be derived by the adoption and operation of the retail method the more important have been very well commented on by T. L. Blanke in one of his recent articles. He has said:

1. It provides a check on losses, errors, and inaccuracies. The book inventory can be checked against the physical inventory, verifying the work of both the book records and of those who handle the stock. If large differences exist, the work can be checked back and errors corrected. The book inventory is then corrected by making adjustments for errors at the time discovered or determined.

2. It affords a definite and consistent basis of taking and valuing inventories for financial statement purposes. The banker will know, as well as the store owner, how the inventory was arrived at. It will establish confidence in the owner's business by the banker, and make it easier to borrow money in time of need.

3. It is good accounting practice to price an inventory at cost or market, whichever is the lower. It is not only good accounting but also conservative financing to do so. The retail method has a tendency to value the merchandise at cost, when market is higher, and at value or market, when the market is lower.

4. Accuracy in its showings and results. It has been accepted by the Internal Revenue Department because the department feels that the ease of verification is one of the more important features, since the complete records of every step from the purchase of items to their final disposition by sale affords an accurate and prompt check, that truthfully can be said is almost impossible in some other system or in valuing inventories on the strict cost, or cost or market, basis as provided for in the regulations. The natural result is that those who use the retail method have substantiating evidence of their actions, whereas those without it are subject to some adjustments which may be felt unjust, but from lack of convincing evidence will probably suffer.

5. It provides a basis for the adjustment of fire losses. The book records will also show at any time just what the amount of stock is in each department of the store so a store can carry sufficient insurance, yet not be overinsured. Where a coinsurance clause is attached to the policy, a store may suffer heavy losses in case of a fire should it be underinsured.

6. It provides the details for a complete monthly operating statement, making it possible to issue an accurate profit and loss statement for the business as a whole, as well as for each individual department.

7. It acts as the basis for the controlling of merchandise stocks. Unless the merchandise manager knows at least once a week the amount of stock in each department, the size of the inventory cannot be controlled nor stock turnover determined.

8. It saves time at the close of the fiscal period when the physical inventory is taken. With the system in operation, it is necessary to take the inventory at retail only. This eliminates the probabilities of errors through the copying and decoding of cost marks. Further, it takes time to refer to cost books from stock numbers on the inventory. This will not be necessary under the retail inventory system.

9. In conclusion, it should be convincing evidence of the worth of the system to know that it is now in use by most of the progressive stores and it is demanded by their buyers because it places in the buyer's hands the information he must have in order to promperly erchandise the departments under his supervision.

The sundry advantages attributable to the retail method group themselves into two main classes: (*a*), advantages at inventory time, and (*b*), advantages during the operating period. While the list above covers in a general way all the principal benefits, several of these benefits are important enough to deserve additional exposition.

Advantages of Retail Method at Inventory Time.—The first advantage of the retail method at inventory time is the ease with which the inventory is taken at selling prices. To take inventory at cost prices, for example, ordinarily requires decoding—the process of deciphering the secret symbols used on price tickets to express the cost. This operation, even though accomplished with the greatest of care may, and generally does, cause many errors. Again, it naturally takes longer to read a cost code and decipher it than to read a selling price. An inventory taken at selling prices can be performed more quickly than any other method.

The next advantage concerns itself with merchandise valuation for tax purposes, an advantage not to be considered lightly in this day of exceedingly high income and profits taxes. In this connection Malcolm P. McNair of the Bureau of Business Research, Harvard University has said:

> More important than the saving in time and the protection against error, however, is the advantage afforded by the retail method in facilitating a proper valuation of merchandise stocks, especially when market value is lower than cost. Income tax regulations do not permit the use of arbitrary methods of depreciation. It is no longer possible for a merchant to take inventory at cost and then reduce the valuation 10 per cent to allow for depreciation. Unless the inventory is to be valued at cost, a merchant using the cost-or-market method is expected to appraise the market value of each item of merchandise. Even under favorable circumstances such an appraisal item by item is an arduous task in a department store carrying thousands of different articles of merchandise. In the case of individual items, furthermore, market value frequently is difficult to ascertain, and does not always represent the real value of the goods to the merchant.

Under the retail method as previously explained, the inventory taken at selling prices is reduced to "cost inventory" by the application of the average mark-up per cent. In actual practice average mark-up per cents are established for each department and applied to the respective departmental retail inventories.

Now, this computation will not give correct results unless, (*a*) all computations are correctly performed, and (*b*) each of the two factors (the amount of inventory at selling prices and the average per cent of mark-up) is correct. Item (*a*), a simple mathematical calculation, need not be considered here. Of the two factors under (*b*), the latter is the one more subject to error and the one which requires the more careful consideration. Applying to the retail inventory an average per cent of mark-up which varies considerably from the true average as actually exists in the merchandise in the inventory will, of course, result in a "cost inventory" which is not the correct "cost inventory." The possibility of the above taking place is always present in those cases where the sale of certain goods in a department during a period is greater or smaller in proportion to the total sales of that department than the proportion of their purchases to total purchases. This statement is based of course, upon the supposition that the per cent of mark-up on those classes of goods whose sales are disproportionate to purchases vary considerably from the average per cent of the department as a whole. In a great many instances the above condition is not a supposition but indeed an actual fact. Concerning this apparently unfavorable feature of the retail method, *i.e.*, the unintentional establishment of ficticious "cost inventories" by the use of incorrect average mark-up per cents, Mr. McNair points out their resultant effects under several varying conditions when he states:

> This possibility of inaccuracy is of more importance on a constant or rising market than on a falling market, since in the latter situation what is desired is a proper market valuation of the merchandise rather than an accurate cost figure. On a constant or rising market, however, if the closing stock has a larger proportion of low mark-up goods than the average, the resultant valuation figure secured by the retail method will be lower than the actual cost. If, on the other hand, the closing stock has a larger proportion of high mark-up goods than the average, the resultant valuation figure secured by the retail method will be higher than the actual cost.

The same writer then briefly explains in what way the chance of using incorrect average mark-up per cents may be minimized. He says:

> The fact that the retail method of inventory is an averaging method, and consequently liable to inaccuracy, has deterred some department store firms from adopting it. It follows from this possibility of inaccu-

racy that this method is most effective where merchandise has been carefully departmentized, so that percentages of mark-up within departments do not show wide variation. Subdivision of departmental stock ledgers in departments handling a varied range of merchandise also may be expected to facilitate the operation of the retail method.

Advantages of Retail Method during Operating Period.—At any time during an operating period the inventory value is, within a reasonable degree of accuracy, easily determinable. (Provided, of course, that the retail method has been properly and accurately operated.) Every retail concern of any size requires it as essential that the management be furnished with a complete monthly operating statement. If such a statement is to be all that the name expresses and implies, it must show both gross and net margins of profit.

To obtain gross profit, and consequently net profit, requires among other things the valuation of inventories by departments. Taking a physical inventory at the end of each month is simply out of the question as is also the operation of costing each and every sales slip and summarizing them. First of all, because of the prohibitive expense involved, and second, because of the lack of time required to do such work in a trustworthy manner. The retail inventory method, then, is the only economical and dependable method for determining monthly inventory valuations by the use of which cost of goods sold, gross profit, and net profit for operating statement purposes, are obtainable.

It has been said of the retail method that "it acts as the basis for the controlling of merchandise stocks." Unlike manufacturing concerns, retail concerns require a more intensive and constant control of their inventories. It is not enough for the latter concerns to know every month whether or not their stock of merchandise reflects a healthy condition. Indeed, they must know at least every week. Goods turning too slowly for one reason or other must be disposed of, and disposed of quickly, whether by use of more advertising, the taking of mark-downs, etc. Retail merchandising requires eternal vigilance and only by means of the figures furnished by the retail method is dependable stock control data economically afforded.

A comparison of the book inventory at the end of a period with the actual physical inventory furnishes an amount which generally is a measure of stock shortages. This matter of stock

shortages is a most important one and has resulted in extended studies, first to determine the causes, and then, to eliminate or reduce those causes as much as possible. T. L. Blanke has this to say on the subject:

> The average retail merchant throughout the country selling one million dollar's worth of merchandise during the year 1921 made a net profit of only $10,000 or 1 per cent on the net sales. In other words, the retailer has been skating on very thin ice. In fact, the merchant with a sales volume of $250,000 lost money to the extent of nearly 1 per cent.
>
> Another direct loss is stock shortages. While the average is approximately 2 per cent, in many stores it runs as high as 4 or 5 per cent *on the net sales*. This loss is due almost entirely to carelessness in handling stock, and the checking of it in and out of the store, unrecorded price reductions, wastage in cutting samples, breakages and stealing of merchandise by employees, and shoplifting. Shoplifting has been listed last because, contrary to general belief, it is much less a cause for losses than waste and carelessness.
>
> A careful accounting system will largely prevent these losses, and result in another saving of at least 1 or 2 per cent. Had this small saving been effected in the year 1921, the net profits of retail stores would have been doubled. With a proportionate saving in mark-downs, retail stores would have shown a very healthy condition. This is especially significant when it is considered that only the stores with accounting systems much better than the average are in a position to even know how much their mark-downs and inventory shortages are. Other stores, lacking such a system, must necessarily have suffered very much greater losses.

The retail method furnishes the book inventory figure with which to compare the physical inventory figure in determining the amount of stock shortages.

Lacking such a method, the amounts of shortages cannot be known. In turn, the seriousness of these losses are not appreciated until too late. Thus, no control is exercised over possibly the most important loss that merchants are facing today.

CHAPTER XII

TAKING AND PRICING THE INVENTORY OF RETAIL CONCERNS

The principles which govern in connection with the physical inventories of manufacturing concerns also govern with respect to the physical inventories of retail concerns. The natural divisions of planning, preparing, taking, pricing, and summarizing apply as well in one case as another.

While the inventory of the retail store is similar to other inventories in principle, it is not similar in a great many details mainly because it has not the variety nor the complexity of the problems which manufacturing inventories have. And again, because of the nature of the retail business there are many matters which are peculiar only to the retail inventory. These special matters are taken up and discussed under their respective natural divisions in the paragraphs to follow.

Planning the Retail Inventory.—The physical retail inventory like the manufacturing inventory must first be planned. Such planning should be developed from two requirements; namely,

1. What results are desired.
2. What methods and processes are necessary to secure those results in the most effective manner.

The most important uses for the final inventory figures are two: first for balance sheet, income statement and tax purposes; and second, for merchandise control and administration. Whatever the use of the inventory figure may be, it is most important that it be accurate. It is well recognized that the inventory is the principal factor in establishing profits or losses for an operating period. Should it be overstated not only may profits be overstated or losses understated, but income taxes may be paid on something that has not been earned. On the other hand an understatement of profits or an overstatement of losses, caused by a fictitious inventory figure may bring about financial embarrassment, change of policies and officers, and perhaps tax penalties. The first requisite, therefore, is accuracy of results.

The form of arrangement of the final figures, *i.e.*, the way the inventory is to be classified, summarized, and presented, demands next consideration. This is a matter which each company must decide for itself. In every case, however, it should be conditioned upon what summaries of classifications are required and the exact use of these summaries. An understanding of the general uses alone is not enough. Unless it is definitely known before the inventory commences exactly in what manner the final figures are to be used, it goes without saying that plans cannot be laid to obtain those figures which may later be urgently required. A concern, for example, has just completed its physical inventory. This inventory has been taken according to the retail method, *i.e.*, each item of merchandise has been inventoried at its retail or selling price. The concern now desires the inventory amount for the "A" department, not only at retail prices but also at actual cost and market prices. If no plans have been made ahead of time to obtain these figures such information is not obtainable from the inventory sheets. It is only obtainable after an expenditure of much additional time and money. Sufficient thought and consideration ahead of time will anticipate such requirements.

Planning the Inventory Form.—No small part of the success or failure of an inventory is due to the kind and design of the inventory form. Hurriedly planned and poorly designed forms give unsatisfactory results. It is therefore quite essential that detail matters pertaining to inventory forms be taken up and discussed at this point.

The form used for recording the inventory count, the price, and all other essential information may be either the tag form or the sheet form. The advantage of one over the other depends to a great extent upon the size of the concern. Where the amount of merchandise is not great and the count may be taken and completed before merchandise starts moving out as a result of sales, the sheet form is generally found preferable to the tag form. Where the opposite condition exists, the tag form has been successfully and advantageously used by many, especially the larger firms. Since the greater number of retail establishments carry a relatively small amount of stock, the sheet form is found to be in more general use.

For the purpose of bringing out the method of using tobh the sheet form and the tag form, two designs of each of these

respective forms are given in the following pages. While for the smaller stores it may appear that a greater amount of information is called for than required, a close examination reveals that even for them such data is essential; not only from the standpoint of profits determination but also from the merchandise standpoint. Forms such as these tell the complete story whether for the use of the organization itself or for the government's agents. Too often the attempt for form simplicity results in the omission of information, the lack of which oftimes causes inconvenience, embarrassment and financial loss. With the possible exception of the detachable verifying slips the sheet forms should be as applicable to the small merchant as to the large concern—and even this one exception, which makes for greater accuracy, may well be used to advantage by all, for the larger concerns by no means have a monopoly on errors made in extensions.

Sheet Inventory Form—Retail Method.—This form on the following page is designed for those concerns operating under the retail inventory method. The outstanding feature of this method, as previously explained, is the pricing of individual items in the inventory at the retail or selling price and reducing the total retail amount of these items to cost by the application of the average per cent of mark-up.

Like other inventory forms, whether sheets or tags, each form it should be noted, has its own serial number. Such serial number should be *printed* on the sheet—not placed there by the sheet writers. In the heading division of the sheet space has been apportioned for the name (or number) of the department where the material is inventoried and also the location within the department. In the upper left-hand section are spaces for recording the initials or numbers of those employees who are responsible for the accuracy of the work appearing on the sheet.

In the columnar section the first five columns are given to the purpose of so describing the article that no mistake should be made in knowing exactly what merchandise was inventoried. The headings of these columns are self-explanatory. For the purpose of facilitating the writing of each sheet a code letter is usually assigned to each month or season and supplied in the column headed by that name. The unique feature in the remaining columns is the means afforded for distributing the retail amount of each item to the season to which the merchandise is

applicable. The totals of these distribution columns should equal the total of the column headed Retail Amount. While this feature of distribution is in a certain way beneficial to the

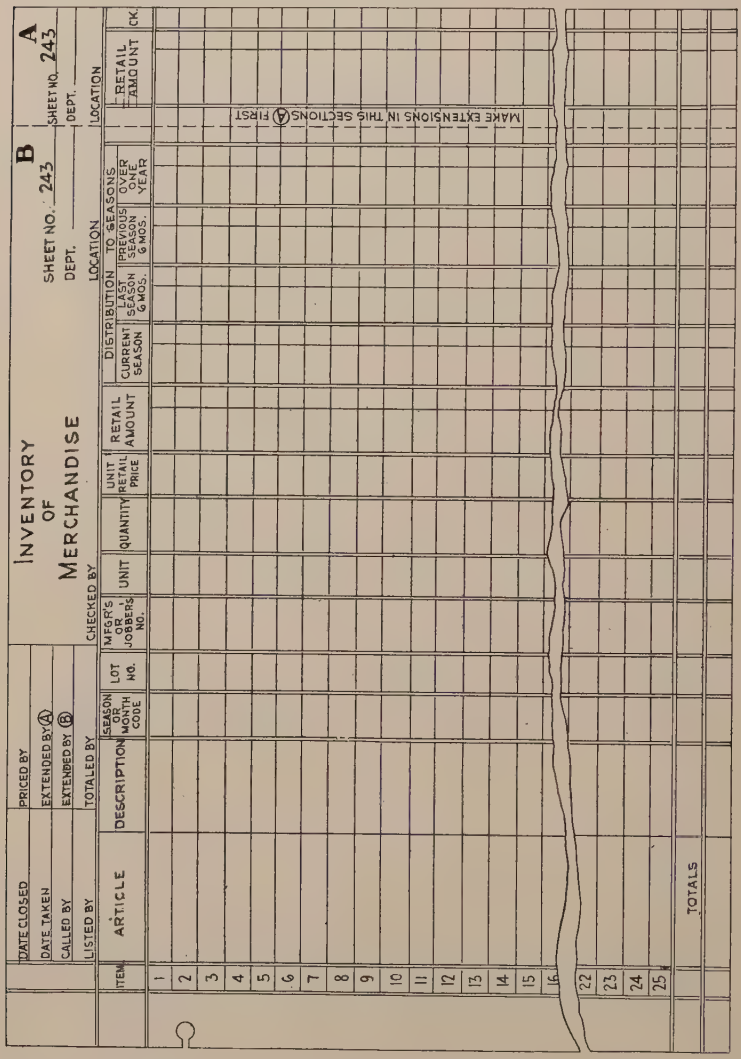


Fig. 40.—Inventory of merchandise form (retail method).

general appraisal of the inventory as a whole its chief function is to furnish information for merchandise management and control. In this respect its value is easily worth the extra effort required to obtain the seasonal classification figures.

The operations required to complete this form are not unlike the operation of other inventory forms. The employees who are taking stock, work in pairs, one counting and calling, the other recording on the sheet the information called. The information filled in by the sheet writer covers the name of the article, description, season code, lot number, manufacturer's or jobber's number, unit of measure, quantity, and unit retail price. When the sheet is completed it is turned in to the employee in charge of the sheet writers, who delivers it to the general office making sure his accountability therefor is released.

Extensions of the quantity by the unit retail price are then made, but instead of these extensions being recorded in the column headed Retail Amount (following Unit Retail Price) they are first recorded in the last column to the right—in the Retail Amount *on the detachable verification slip A*. When all extensions have been made this column is totalled and the slip detached.

The sheet is then extended by another clerk who places the extensions in the Retail Amount column on Part B of the sheet. This column is totalled and the amount compared with the total on "A." If these two amounts agree it is presumed that the work of the extenders is correct and the individual extensions on "B" may then be distributed to their respective season columns. The sum of the totals of these four distribution columns should, of course, equal the total of the Retail Amount column.

Sheet Inventory Form—Cost Method.—Although this form on the following page includes columns for a record of the unit retail prices and retail amount, the purpose for which will be subsequently shown, it is designed primarily for the inventory taken on the basis of cost instead of selling price. Cost here is used in its broad sense and implies both the inventory taken at cost and also the inventory taken at cost-or-market, whichever is lower.

The design of the heading section of this form is similar to the form used for the retail method described above and the columnar section is of nearly the same arrangement. The two differ but slightly. It will be noted that the present form contains additional columns in the main part (B) for Unit Value—Cost and Market, and Cost-or-market Amount; and an extra column on the detachable verifying slip A, for Cost or Market Amount. The arrangement of this present form is such that any one or

all of three prices—retail, market, or cost—may be recorded. The benefits of comparison are obvious.

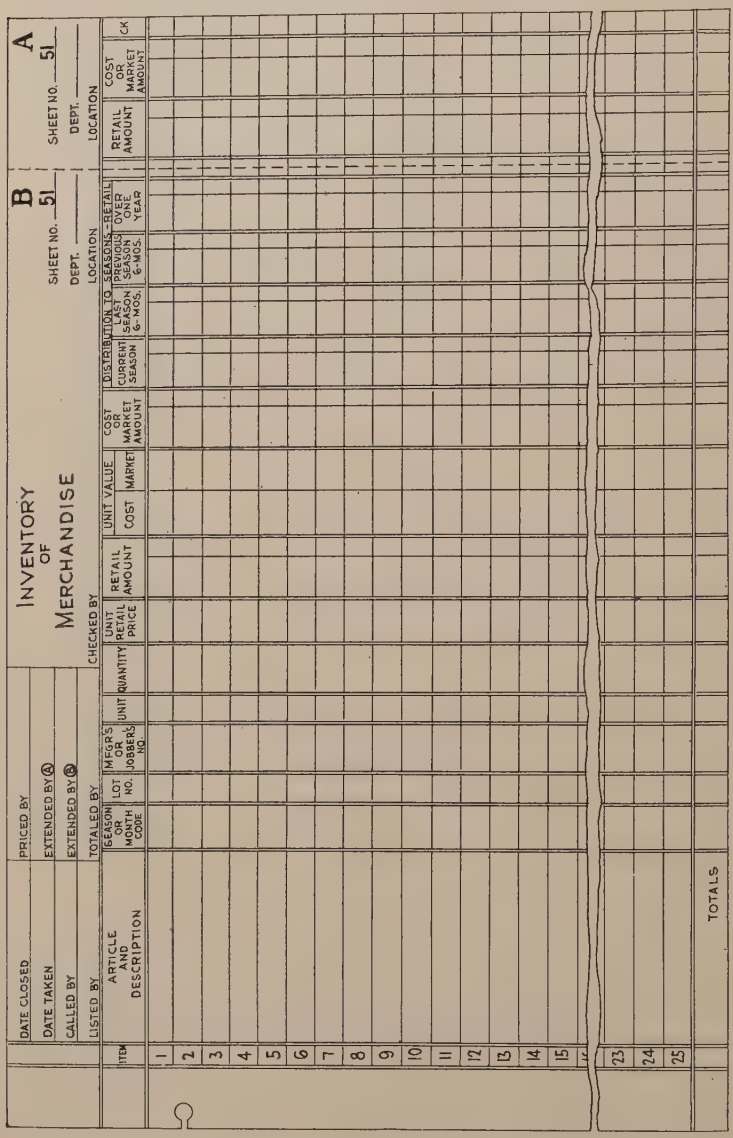


FIG. 41.—Inventory of merchandise form (cost method).

In using this form the sheet writer, in addition to the usual description of the merchandise, records the unit cost of each item of merchandise and also the unit selling price. If the

inventory is to be priced at cost, extensions are made first onto detachable slip A and then on B, similar to the process described under the retail form. On the other hand, and in the case of pricing at cost-or-market whichever is lower, it is necessary for the buyer to furnish the market price of each article in the column set aside for that purpose, before any work of making extensions may be done. The lower of these two prices is then indicated and the extensions are made—the lower price by the quantity. The result is the inventory on the cost-or-market basis.

Obtaining the amount of inventory at selling price while obtaining the inventory figure on the basis of cost, or cost-or-market whichever is lower, has certain advantages. Briefly stated they are:

1. Information is furnished which makes for better merchandise control and management.
2. Adjustments may be made to correct the average mark-up percentage by correcting the inventory carried at retail and cost on statistical records. This refers particularly to those concerns who although not using the retail method for inventory purposes, maintain in a less exact way the average per cent of mark-up for the purpose of computing approximate monthly gross profits.
3. The retail figure is needed if the concern is changing from the cost to the retail inventory method.

Tag Form.—The use of the tag form shown here for physical inventories of retail businesses is at present generally limited to the larger establishments. In those establishments where the work of inventorying is no mean undertaking it is necessary that such processes or devices be adopted as will bring about accurate results with the minimum cost and confusion. The tag form has the following advantages not enjoyed by the sheet form:

1. The tag may be written up in advance of the inventory date. This means that the count in the selling departments, stockroom, etc. can be made in a fraction of the time otherwise required. Also, the tags are more complete in description and more legible.
2. Merchandise can be inventoried in advance of inventory closing date. All merchandise received or sold after physical count, but before closing date, can be recorded on the reverse side of the tag and the actual count adjusted to the net changes. By this method it is not necessary for all departments to be inventoried at the same time.
3. Since it is customary not to collect the tags in each department until everything has been counted, the omission of a tag from some

merchandise indicates the omission to inventory. Attached tags indicate counted merchandise.

4. Tags have an advantage over sheets with respect to sorting and classifying.

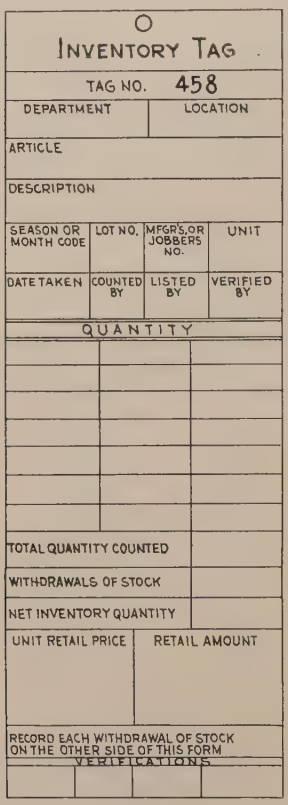


FIG. 42.—Inventory tag (retail method).

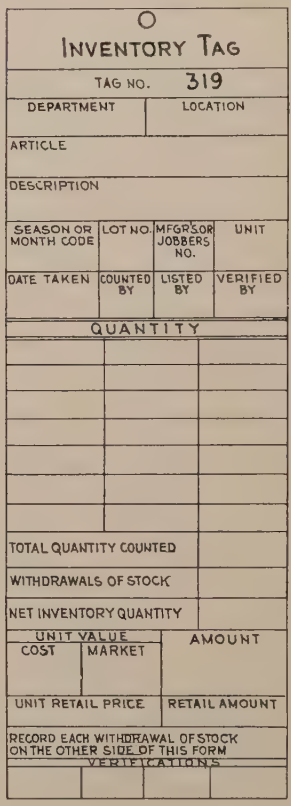


FIG. 43.—Inventory tag (cost method).

Operations required in connection with the tag form have no particularly unusual features. A separate tag is required for each kind and lot of merchandise; the article is completely described; the tag is attached to the merchandise, and is subsequently collected when all other tags in the same department are collected on the closing date of the inventory. All tags are then extended and the extensions checked. When completed the tags are then used as the basis for inventory summaries: by kind and class of merchandise, by departments, by seasons, etc.

It should be noted from the sample forms of the tag as shown here that each tag has its distinguishing tag number. By this means only is it possible to determine if all tags have been turned into the office. One rule with respect to the use of tags is worthy of repeating. It is this: "*Every tag should be accounted for, whether used or not used. No tag should be destroyed. Tags once issued, should not be loaned to or borrowed from another.*"

The two tag forms shown here differ to the extent of the pricing feature only. In one instance the retail price is used; in the other, allowance has been made for not only cost, but market and also retail prices. Should the actual count be taken before the closing date, all withdrawals from stock should be recorded on the reverse side of the tag and the total brought forward to its proper space Withdrawals of Stock on the front of the tag. If the physical count is made on the closing date the withdrawal section need not be taken into consideration. The actual count is then the net quantity.

Initials of Tag Writers.—Every means should be taken to allow the tag to be written as quickly as possible. In many instances in order to save the time required to write out the name of the counter, tag writer, etc., initials are substituted. Unfortunately it is discovered later that many of these initials are absolutely illegible. Some concerns find it advantageous to allow the employees to use their employee number or assign arbitrary numbers to each one participating in the inventory. In the latter instance a list is prepared showing opposite each employee's name the number assigned for inventory purposes. This list should be preserved for future reference.

Planning with Respect to the Merchandise.—There are many details associated with the treatment of merchandise during an inventory which must be given consideration ahead of time. First of all it must be definitely decided exactly what merchandise is to be included in the inventory and what is to be excluded. This involves such matters as goods in transit, consigned merchandise, repairs, "lay-aways," or "will-calls," etc. Next, the location of all merchandise, whether in selling departments, storerooms, outside for repair, in warehouses, etc., should be listed and plans laid so that each location will be covered at inventory time and nothing omitted from the count.

It is important that the stock of merchandise should be put in good shape prior to the inventory so that the counting may be

performed as quickly and as accurately as possible. If broken lots are not assembled; if scattered goods are not collected; if stock is not piled properly; then, the work of the inventory clerks will be greatly retarded. All merchandise in the marking room either for their original price tickets, or for remarking, should be delivered to their proper departments before the inventory. Plans are necessary if these and many other important matters are to be handled and handled promptly and properly at the inventory time.

Planning the Inventory Organization.—Before it is possible to select and instruct employees for inventory duties it is necessary to decide upon a general plan of the inventory organization and the various divisions and subdivisions thereof. The taking of a physical inventory involves more than the counting of merchandise and a record of the same. Among other things it involves the issue and accountability of all records, the inspection of merchandise, extending, checking, classifying, and totaling—work which should be delegated to those employees best suited to accomplish it.

The number of employees required for the inventory is dependent on several matters. The first thing is that with respect to the amount of outside help to be used. Many concerns make it a practice of hiring so-called inventory companies to make and check all extensions on the inventory sheets. If such is the case then the company's employees will not participate in this part of the inventory work. The number of stock counters and writers is next determined by the size of the inventory and the time allotted within which to make the count. Past experience will serve best in these instances. The number of employees to be utilized on other work may likewise be determined from experiences gained from former inventories. Thus the divisions of the organization as a whole should be planned and the number of employees required within each division decided ahead of time.

Poor planning with respect to the inventory organization may have disastrous results. Too few employees utilized for the work may accomplish either or both of the following results:

1. Unsatisfactory work resulting from undertaking to do too much within the allotted time.
2. Failing to complete the inventory work in the time allotted.

On the other hand too many employees will not only cause an unnecessarily high expense for the inventory but will indeed retard the work by reason of getting in each other's way.

Instructions.—The next matter which requires definite plans is that with respect to the detail methods and processes necessary in securing the results desired within the shortest possible time, with the least expenditure of money, and in the most uniform manner. This involves the arrangement and publication of complete instructions applicable to inventory preparations, the actual counting and listing, the extending and checking and the summarizing. Each rule should be clear, specific, and exact; nothing should be left open for unauthorized or arbitrary decisions. Copies of these instructions should be issued sometime before inventory date in order that each and every employee who is to participate in the inventory may know what he is to do, where it is to be done, and how it must be done.

Preparing for the Physical Inventory.—The process of making ready for the physical inventory calls for a consideration of each of the following matters:

1. Inventory forms.
2. General records.
3. Merchandise.
4. Personnel.

Exactly how much time is required before inventory date to make complete preparations for an inventory is a question which must be decided by each concern itself. Some concerns start their preparations four weeks ahead of the appointed day; others allow themselves but one week—some even less than a week. Whatever may be the allotted time within which all preparations are to be completed, it is imperative that nothing be left undone when the day for counting and listing arrives.

Although nearly every concern may be said to have its own individual problems in preparing for an inventory, there are many features of preparation which are as common to one concern as another. Instructions with respect to some of these common features are listed under each of the four items mentioned above.

Inventory Forms—Preparation.

1. A sufficient number of correctly designed inventory forms (sheets or tags) on which the physical count is to be recorded, should be printed and on hand at least one week before inventory.

2. The inventory forms may be printed on various tinted paper and special tints assigned to various departments, floors, stores, etc.

3. All inventory forms should be serially numbered. Serial numbers should preferably be *printed* on each sheet.

4. A sufficient number of inventory forms should be assigned and distributed to each department manager before the inventory date.

5. A record should be kept showing to whom each form has been distributed. Those charged with forms should be held accountable until the return of each and every form, whether it is used or unused.

General Records—Preparation.

1. All documents such as merchandise invoices, memorandum invoices, consigned merchandise invoices, etc., in the hands of the receiving room, the merchandise manager, and the buyers, should be cleared up and returned to the general office several days before the inventory.

2. All invoices for merchandise should be marked, checked, signed, verified, and entered, before the inventory date.

3. All documents applicable to claims against vendors and manufacturers, and all debit memorandums for merchandise returned, should be made out and entered on the records prior to the inventory.

4. All paper covering additional mark-ups, addition mark-up cancellations, mark-downs and mark-down cancellations, should be completed, turned in, and entered on their proper records.

5. All paper covering transfers of merchandise between departments, and paper covering withdrawal of merchandise for special purposes such as expense supplies, should be completed and properly recorded.

6. The book inventory in the general ledger and the retail inventory form and supporting records should be completed up to the date of the inventory.

Merchandise—Preparation.—Before the inventory commences the following matters should be attended to:

1. All broken lots should be assembled.

2. Merchandise which has been scattered should be assembled properly.

3. All miss-mates should be mated.

4. Pile and arrange stock for quick count.

5. Clear departments of all unsalable items.

6. All empty boxes, containers, etc., should be removed from departments before inventory date and departments cleaned up.

7. All merchandise in the receiving room should be inspected, checked, marked, and sent to the proper stockroom or selling department.

8. Damaged merchandise should be marked-down.

9. Merchandise to be transferred between departments, warehouses, manufacturing departments and other internal departments should be so transferred before the inventory date.

10. All merchandise in the marking room for original price tags or relabelling should be tagged and delivered to the proper departments.

Personnel—Preparation.

1. Assignment lists should be posted several weeks prior to the inventory. These lists should give the names of those who are to participate in the inventory, the department to which they are assigned, and the nature of the work each is to perform.

2. Instructions concerning inventory matters should be printed and issued to each employer at least one week prior to the inventory date.

Taking Physical Inventory.—How well the inventory has been planned and prepared for is soon disclosed on inventory day. If everything that should be done has been done the work of counting, listing, etc., should go off smoothly. On the other hand, let something important be overlooked—lack of forms, perhaps, too small a number of employees, or poorly instructed employees—and the whole inventory is handicapped at the start. It is, of course, important that each employee be on hand 15 or 20 minutes ahead of the starting hour in order that he or she may receive supplies and forms and be assigned to the person or persons with whom each is to work.

The head of each department should be charged with the responsibility of making the count in the most systematic manner possible. The count for each section in a department should start at a definite place and end at a definite place, and between these two points the counting should be done in such orderly fashion that no merchandise may possibly be overlooked. Each department head should also be charged with getting the inventory under way with no confusion and with little or no wasted time. Once the counting and listing commences the work should progress without need for any extraordinary supervision. It is necessary, however, for the deparment head to be always on hand to answer any local question that may be put to him for decision.

There are several important points in the taking of the inventory which, if closely followed, will make for better results. These points are:

Taking Inventory.—1. The official inventory forms only should be used in recording the original count. Where scraps of paper or other forms are used to record the count temporarily, errors in transcribing are generally made.

2. Under no condition should an inventory tag or sheet, whether used, unused, or voided, be destroyed. Every sheet or tag originally issued by the controller must be returned to him. Inventory forms should be used only in those departments to which they have been issued. Inventory forms should not be loaned to or borrowed from another. Every sheet or tag must be accounted for.

3. Employees receiving inventory forms should sign for them.

4. All inventory forms, used or unused, should be properly protected during the process of taking inventory.

5. All inventory sheets should be turned into the office just as soon as completed. When the last department has been inventoried, all sheets should be in the hands of the controller.

6. If inventory tags are used instead of sheets the tags should not be collected from a department until all merchandise has been counted. At that time all tags in the department should be detached, accounted for, and returned to the controller.

7. No erasures should be allowed on the inventory forms. If an error is made a line should be drawn through it and the correct entry made above.

8. Should an inventory form be unfit to use for one reason or another, the work "void" should be written prominently across the face and the sheet or tag returned to the controller the same as any good sheet or tag.

9. Counters and writers should work in pairs or perhaps groups, the former calling the count, the latter making a record of it. Sometimes it is possible for one writer to handle the work of two or more counters, especially when the quantities to be counted are large.

10. Employees writing the inventory forms should be careful to record the correct descriptions and prices. If a "call" by the counter is not clear, the writer should have it repeated. Writers should fill in the complete price, supplying naughts in the cents column should the unit price be given only as so many even dollars. This should prevent errors in extending.

11. Writers should have a uniform way of reporting in fractions. Yardage fractions should be written in terms of eighths; dozen fractions in terms of twelfths, etc. All fractions should be clear and distinct with no chance of wrong interpretation.

12. All merchandise, whether current or reserve stock, should be counted. All boxes should be opened and the merchandise therein counted.

13. The buyer or assistant buyer of each department should look over all completed inventory sheets and determine the correctness of prices, reasonableness of quantities, etc. Buyers should see that no merchandise has been omitted from the inventory.

BLUE BIRD DRY GOODS CORPORATION

Comparative Inventory Statement

December 31, 1924

	Inventory, 12/31/24	Inventory, 12/31/23	Difference	
			Decrease	Increase
Dry goods				
1. Silks and velvets	$25,500	$21,000	.....	$4,500
2. Dress goods	15,600	14,500	.....	1,100
3. Linens and domestics	21,000	17,000	.....	4,000
4. Laces, trimmings, and embroideries	6,500	11,500	$ 5,000	
5. Neckwear and veilings	5,000	4,500	.....	500
6. Ribbon	3,700	3,500	.....	200
Total	$77,300	$72,000	$ 5,000	$10,300
Increase of	.....	.....	.....	$ 5,300
Small wares				
1. Notions	$10,000	$9,100	.....	$ 900
2. Toilet articles	6,500	6,600	$ 100	
3. Handkerchiefs	3,100	2,900	.....	200
4. Silverware and jewelry	7,500	9,000	1,500	
5. Leather goods	9,300	5,000	.....	4,300
6. Needlework	2,700	2,300	.....	400
7. Umbrellas, parasols, and canes	1,500	1,700	200	
8. Art work	2,000	1,100	.....	900
Total	$42,600	$37,700	$ 1,800	$ 6,700
Increase of	.....	.....	.....	$ 4,900
Shoes				
1. Women's shoes	$22,000	$17,500	.....	$ 4,500
2. Children's shoes	19,100	14,000	.....	5,100
3. Boys' shoes	12,000	10,000	.....	2,000
4. Men's shoes	.....	12,000	$12,000	
Total	$53,100	$53,500	$12,000	$11,600
Decrease of	.....	.....	$ 400	

BLUE BIRD DRY GOODS CORPORATION

Comparative Inventory Statement

December 31, 1924

	Inventory, 12/31/24	Inventory, 12/31/23	Difference	
			Decrease	Increase
Women's and Misses's Ready-to-wear				
1. Women's coats	$ 30,000	$ 25,600	.....	$ 4,400
2. Women's suits	52,000	47,000	.....	5,000
3. Women's skirts	21,400	16,500	.....	4,900
4. Women's dresses	28,200	24,000	.....	4,200
5. Misses's coats	29,500	27,800	.....	1,700
6. Misses's suits	40,000	32,000	.....	8,000
7. Misses's skirts	20,500	18,500	.....	2,000
8. Misses's dresses	24,000	21,000	.....	3,000
9. Furs	32,000	22,000	.....	10,000
10. Juniors' coats	17,000	14,000	.....	3,000
11. Juniors' suits	19,500	15,000	.....	4,500
12. Juniors' skirts	13,200	10,000	.....	3,200
13. Juniors' dresses	14,100	11,100	.....	3,000
14. Waists and blouses	19,400	16,300	.....	3,100
15. Sweaters and knit goods	13,700	11,500	.....	2,200
16. Sport wear	21,000	14,000	.....	7,000
Total	$395,500	$326,300	.....	$69,200
Increase of	.....	.....	.....	$69,200
Women's Ready-to-wear accessories				
1. Millinery	$ 25,000	$ 19,800	.....	$ 5,200
2. Gloves	11,000	9,000	.....	2,000
3. Corsets and brassieres	13,400	12,100	.....	1,300
4. Hosiery	16,200	14,100	.....	2,100
5. Underwear	14,700	10,700	.....	4,000
6. Infants' wear	4,000	9,000	5,000	
7. Petticoats	6,000	9,500	3,500	
8. House dresses	11,200	10,000	.....	1,200
Total	$101,500	$ 94,200	$ 8,500	$15,800
Increase of	.....	.....	.....	7,300
Total Inventory	$670,000	$583,700	.....	$86,300

14. The inventory of material in transit (inward) should be made from the invoices.

15. Although merchandise in selling departments should not be counted before the official day of the inventory, it is advisable many times to count the reserve stock ahead of that date. If this is done precautionary methods should be instituted to prevent both the omission from the inventory of new merchandise coming into reserve stock, and also the duplication of goods leaving reserve stock for selling departments—these transactions falling within the period between the actual counting date of the reserve stock and the official inventory date.

16. In order to prevent possible duplications or omissions of inventory the movement of merchandise between departments during the counting should be prohibited.

17. The inventory of expense supplies should not be overlooked.

18. In order that no merchandise may be missed each of the following locations should be thoroughly covered:

a. All selling departments.
b. Storerooms.
c. Warehouses.
d. Show windows.
e. Display places in store.
f. Holdroom.
g. Workroom.
h. Outside on memorandum.
i. Outside for repairs.
j. Receiving room.
k. Advertising office.
l. Comparison office.
m. Private office.

Single Count or Additional Verification.—Whether a single count of merchandise is all that is required or whether there should be an additional count for verification purposes is a problem which is not monopolized by retail concerns alone. This is a problem which may arise in the instance of any inventory. It can be answered only after a thorough knowledge of the particular conditions of each concern is obtained.

Some concerns consider one count sufficient; other concerns demand that the complete inventory count be independently verified; others consider one count quite adequate for certain departments but demand an independent check of the first count in the other departments. It is quite easy to see that one or

two fur coats overlooked in the fur department would make more of a serious difference than failure to include one dozen aluminum spoons in the inventory of another department. It is not unusual then for merchandise of high unit value to be subjected to two counts, the original and a verification. To make a detail check of the count of low-priced merchandise may be a lack of good judgment.

Where the accuracy of the original count is to be checked, the verification should be an independent one; *i.e.*, the second count should not be checked from the original inventory sheets. The time required to verify the count may be materially shortened when the original inventory sheet is written if the description of the merchandise is recorded on the verification copy. This can be done by padding the sheets in the order of original and duplicate and using a short piece of carbon paper when writing the original. Information up to the Unit column can be filled in on the duplicate or verification sheet without any extra labor. The original sheet goes to the office while the duplicate is turned over to the verifiers for quantity, price, etc. If this method is used, both the original and the duplicate should bear the same identifying serial number.

If this method is considered too elaborate, then no duplicate should be used. Instead the count should be verified from the inventory sheet. This latter method, however, is not an independent check and therefore not as trustworthy as the duplicate sheet method.

Pricing the Inventory of Retail Concerns.—Pricing a retail inventory is the process of assigning to each item of merchandise its unit dollars and cents value. The term value is used here in its accepted accounting sense and not in its restrictive sense.

Inventories of retail concerns may be priced on one or the other of the following bases: (*a*) Cost: (*b*) Cost-or-market, whichever is lower.

The shorter title of (*b*), *i.e.*, "Cost or Market," will be used in subsequent paragraphs instead of the longer title given here. While there are other bases for evaluating inventories, the two named above are the most commonly used and they have the advantage of meeting the requirements of the Government for tax purposes. It is not amiss at this time to point out that the retail inventory method of pricing an inventory is for all intents

and purposes a *cost or market* basis. Exactly how this happens is shown later.

The application to retail inventories of each of the bases named above, (*a*) and (*b*) are to be discussed in the following paragraphs, but before proceeding it is necessary that the exact meanings of the words "cost" and "market" be understood. The following definitions cover the matter in excellent fashion. They have been taken from the Revenue Act of 1921, Regulations 62, Arts, 1583 and 1584.

"Cost" means:

1. In the case of merchandise on hand at the beginning of the taxable year, the inventory price of such goods.

2. In the case of merchandise purchased since the beginning of the taxable year, the invoice price less trade or other discounts, except strictly cash discounts approximating a fair interest rate, which may be deducted or not at the option of the taxpayer, provided a consistent course is followed. To this net invoice price should be added transportation or other necessary charges incurred in acquiring possession of the goods.

3. In the case of merchandise produced by the taxpayer since the beginning of the taxable year (*a*) the cost of raw materials and supplies entering into or consumed in connection with the product, (*b*) expenditures for direct labor, (*c*) indirect expenses incident to and necessary for the production of the particular article, including in such indirect expenses a reasonable proportion of management expenses, but not including any cost of selling or return on capital, whether by the way of interest or profit.

"Market" means:

1. Under ordinary circumstances, and for normal goods in an inventory, "market" means the current bid price prevailing at the date of the inventory for the particular merchandise in the volume in which usually purchased by the taxpayer.

2. Where no open market exists or where quotations are nominal, due to stagnant market conditions, the taxpayer must use such evidence of a fair market price at the date or dates nearest the inventory as may be available, such as specific purchases or sales by the taxpayer or others in reasonable volume and made in good faith, or compensation paid for cancellation of contracts for purchase commitments.

3. Where the taxpayer in the regular course of business has offered for sale such merchandise at prices lower than the current price as above defined, the inventory may be valued at such prices less proper allowance for selling expense, and the correctness of such prices will be deter-

mined by reference to the actual sales of the taxpayer for a reasonable period before and after the date of the inventory. Prices which vary materially from the actual prices so ascertained will not be accepted as reflecting the market.

The definition of the word "cost," as given above, is the same under the *cost or market* basis as under the *cost* basis.

In connection with the definition of cost, attention is directed to its first paragraph wherein the matter of merchandise in the closing inventory carried through from the opening inventory is considered. Not only does this apply when the pricing basis is a *cost* basis, but also when the pricing basis is a *cost or market* basis. The latter basis requires both the unit cost and the unit market price of each item of merchandise before the selection and use of the smaller of these two figures may be made. When this basis is being used, and there are goods in the inventory which were also in the inventory at the *beginning* of the period, the selection of the proper price should depend on the following procedure:

> . . . therefore, where an inventory of goods at the close of a taxable year includes merchandise which was on hand at the beginning of the year, the cost thereof, to be compared with market in applying the basis of cost or market whichever is lower, should be the price at which such goods were included in the opening inventory. (Bureau of Internal Revenue, Commissioner D. H. Blair, Nov. 4, 1922.)

To illustrate this, let it be assumed that a certain style of table appears in the inventory of the furniture department as of Dec. 31, 1923. This table was purchased in August, 1922 at a cost of $250, but on the basis of *cost or market* was priced in the inventory of Dec. 31, 1922 at the market price of $200. The market price as of Dec. 31, 1923 is $225. What price should be used for the 1923 inventory?

On the basis of the tax procedure, the *cost* for the 1923 inventory is $200 and the *market* is $225. The unit price used for the 1923 inventory should be the price at which the table was priced in the opening inventory, or $200.

Irrespective of the basis used in pricing, there are but two ways of *taking* the inventory of a retail concern: namely, at cost, and at selling prices. An inventory taken according to the first way (at cost) naturally implies the absence of the accepted retail

method, while just the opposite condition exists if the inventory is taken at selling prices.

Whether the *basis* of inventory valuation is to be *cost* or *cost or market* (in instances where the retail method is not in use) the inventory is actually *taken* by calling off the unit cost price of each item of stock from the cost code on the price tickets which are attached to the merchandise, and recording them on the inventory sheets. If the inventory is to be *priced* on the *cost* basis then these prices will be used. On the other hand, if the *cost or market* basis is to be used the unit market prices of each item of merchandise in addition to the unit cost prices, must be supplied in order that the two prices may be compared and the smaller one taken.

Where a concern is not operating under the retail inventory method it is recommended as the best practice, to price the inventory on the basis of "cost or market, whichever is lower." Where a concern is operating under the retail method, and the inventory is taken at unit selling prices, the inventory cost valuation is put on a *cost or market* basis by the application of the average per cent of retail mark-up. The basis in this latter instance is not an exact *cost or market* basis but so close to it that it is not incorrect to so classify it.

Under the retail method the inventory is taken at the unit retail or selling prices. This means that when each item of merchandise is inventoried the unit selling prices, instead of the unit cost prices, are called off by the counters, and recorded by the writers on the inventory sheets. Under this method also, the total amount of merchandise at selling prices is next determined for each department and each respective total reduced by the application of the average per cent of purchase mark-up prevailing in each respective department. The result is what is known as the "cost inventory" of each department. The totals of all departments establish the valuation of the inventory on a *cost or market* basis. "Cost inventory" is used here in contrast to "retail inventory." The former refers to an inventory priced at cost, or cost or market; the latter to an inventory priced at selling prices.

The reason that the retail method gives a very close *cost or market* valuation to an inventory is this. If no changes in the *original* selling prices were ever made, the result of reducing the retail inventory by the average per cent of mark-ups would be

the original cost—a *cost* basis. But changes in selling prices are constantly taking place. Some are additional mark-ups, but most are mark-downs. Now, in the form for computing the retail inventory under the retail method, additional mark-ups *do* affect the average per cent of mark-up, but mark-downs do *not*.

Additional mark-ups, however, generally affect the average per cent of mark-up but little. In fact so slight is the change that its effect in many instances is negligible. Mark-downs on the contrary usually amount to a substantial figure—indeed a very substantial figure; but they do not affect the average per cent of mark-up. They do, though, affect the total *amount* of retail inventory because they are taken directly off the price tickets on the merchandise. As a result, mark-downs make the retail inventory smaller. The average per cent of purchase mark-up now taken off the new but smaller inventory at retail results in a cost inventory less than the actual cost. This difference is explained as the fall in the market price below cost of those items of merchandise in the inventory on which mark-downs have been taken.

The retail method in the majority of instances no doubt has a real tendency to put the inventory on a *cost or market* basis. But let the average per cent be substantially affected by additional mark-up and that basis will not apply. The retail method in addition does not, because of the treatment of mark-downs, carry its prices all the way down to market price.

In spite of these matters which make the inventory valuation, under the retail method, a trifle higher than a true *cost or market* valuation, the difference in the greater majority of concerns is generally so small as to be unimportant. Generally it does not warrant questioning too closely the correctness of the results obtained by use of the retail method.

The big advantage one concern operating under the retail method has over another concern operating without it, is that of pricing the inventory when the *cost or market, whichever is lower* is the accepted basis of the latter concern. In the absence of the retail method the second concern is required to determine and set opposite each item in the inventory its unit market value, a laborious task the accuracy of which is questionable in a great many cases. Whereas in one case (without the retail method) hundreds or thousands of unit market values must be obtained and comparisons made with the unit cost prices before the inven-

tory valuation of a department may be obtained, in the other case (with the retail method) but one calculation is required—the application of the complement per cent of the average mark-up per cent to the inventory at retail prices. The great saving made in time and inventory clerical expense by use of the retail method will be quite evident from the following operations:

1. *Without Retail Method:*
   a. List unit cost of each item on inventory sheets.
   b. Obtain market value for each item.
   c. List the unit market value for each item on the inventory sheets.
   d. Select the lower of the two prices, *cost* or *market,* and list.
   e. Multiply the selected price of each item by its respective quantity.
   f. Total the extensions.
2. *With Retail Method:*
   a. List unit retail price of each item on inventory sheets.
   b. Multiply the unit prices by the respective quantities.
   c. Total the extensions.
   d. Apply the complement of the average per cent of mark-up to the total.

CHAPTER XIII

VALUATION OF INVENTORIES

This chapter concerns itself with inventory valuation. It thus involves a discussion of those matters which must be considered in securing unit prices, which when applied to the respective quantities of various items of merchandise and materials, result in the physical inventory data being expressed in terms of conservative value. Because of its transitory nature, and the many things that may effect to cause an increase or decrease in its value, the valuation of this balance sheet item is many times a difficult thing to establish within a reasonable degree of accuracy.

A discussion of inventory valuation is a discussion of pricing leading one back to the question of whether the balance sheet should be a picture of true financial standing or of conservative financial standing. Those who are advocates of the first position hold that the inventory should be an exhibit of true, rather than of conservative values. Unfortunately this position is untenable for the simple reason that the true value of any item of inventory after all, cannot be determined until such item has been sold. In the meantime, *i.e.*, until sale has been effected, the value of all items constituting the inventory must necessarily be estimated, whether the attempt is made to set up the inventory on the basis of so-called true valuation or on conservative valuation. Actually, the former basis for inventory valuation should differ from the latter only when market (and also values established from sales prices) is greater than actual cost. When these two conditions exist, use of the so-called true valuation basis affords the period of which the inventory date is the terminating date the benefit of any increase in inventory value resulting from increased market prices. Whether or not such increase is taken directly into the profits of that period, or held in a reserve until the merchandise or material is actually disposed of, is another thing. However, when the attempt is made to show the inventory at its so-called true valuation in the balance sheet—

provided such valuation is greater than conservative value—the difference between the two should be shown as an offsetting reserve if those analyzing this statement are not to be deceived. It is only when prices are swinging upward that there is any noticeable difference between the above two bases of valuation. When market and net selling prices are equal to or lower than cost, then prices for inventory purposes on both bases, for all practical purposes, are identical.

Without fear of satisfactory contradiction it may be said that most inventories are now valued conservatively on the basis of "cost or market, whichever is lower," a basis which, as will be shown later, really amounts to pricing at cost—except during times which are not uniformly normal. By this means—cost or market whichever is lower—an inventory is priced so as to place it on a basis of replacement or reproduction values, which in most cases will be found to be conservative values. The reason that at no one time can an absolutely true value for the entire inventory be determined is because of the inherent nature of merchandise and materials. Merchandise is not purchased for the purposes of holding and enjoying. It is acquired for the purpose of reselling as quickly as possible, and at a profit. Therefore, its true value cannot be determined until actual sale thereof has been consummated. Although it is not possible to determine the true value of an unliquidated inventory it is possible, however, to obtain a figure representing a quite accurate conservative value by the use of certain rules and procedures and at the same time by taking into consideration the possibility of future demand for the product or merchandise.

Definitions.—In a discussion of inventory valuation there are four expressions which are used time and time again. It is important therefore that these be defined right at the beginning in order that no confusion exist with respect to subsequent statements.

Cost.—The word cost alone without qualifications, is used here to mean actual cost. Actual cost is that amount of dollars and cents *expended* by a concern in acquiring or producing for use or sale, items of merchandise or materials, consideration being given to all expenditures necessary to locate the material in the place where it is to be used or sold.

Replacement Cost.—Replacement cost is the amount of dollars and cents which a concern would have to pay *to another concern* to secure

from the latter, merchandise or materials of the same quantity, quality, and design as the merchandise or material in the inventory.

Reproduction Cost.—Reproduction cost is the amount of dollars and cents which a concern would have to spend to duplicate, *by use of its own manufacturing facilities*, items of merchandise or materials in the inventory. Many times the expression "replacement cost" is used interchangeably with reproduction cost, and vice versa. However this may be, it is believed later discussion will be made clearer by distinguishing these two terms in accordance with the definitions above.

Market.—The following extract, taken from the income tax regulations defines "market" as used here:

> Under ordinary circumstances, and for normal goods in an inventory, "market" means the current bid price prevailing at the date of the inventory for the particular merchandise in the volume in which usually purchased by the taxpayer.

It will usually be found that when the term "market" is used in a general way it includes not only the cost of replacement but also the cost of reproduction.

Cost and Market.—The most generally recognized and used rule for valuing inventories and the one rule that in practically all instances secures conservative valuations is that of "cost or market whichever is lower." Under this rule each item in the inventory is priced both at cost and market, the lower of these two unit prices determined and the one selected multiplied by the respective quantity. The total of all extensions results in the inventory valuation. That there have been cases where this method has not been understood is evidenced by inventories which have been incorrectly valued by use of a method whereby all extensions were first arrived at by using market prices alone, then by using cost prices, and the lower of the total of all extensions taken as the value of the inventory.

Up to this point *cost* and *market* have been used in an abstract way. It has been assumed that both cost and market are definite and inflexible figures which are not difficult to secure and that the application of the rule "cost or market, whichever is lower" is merely a matter of determining which price is the lower. Unfortunately, in practice just the contrary is true. Cost to one person or concern is not cost to another, whether it is raw material, work-in-process, finished product, merchandise, or supplies. Market in theory is as simple as its definition; in practice it is a most difficult thing to determine particularly during periods of price declines. Therefore, the first matter in connection with

inventory valuation is to decide what elements are proper charges to the cost of the various divisions of the inventory and also how unit costs are established; and second, what is "market" and how are market prices secured.

Cost—*General.*—Establishing unit costs for inventory purposes is not the easy task that it might many times seem to appear. Even in the instance of merchandise for the mercantile concern and raw materials and supplies for the manufacture there are many matters which must be duly considered as affecting cost. In such cases, for example, it is not just a matter of the proper treatment of the invoice cost and the direct charges such as transportation, insurance, duty, cartage, etc. The more difficult matters of indirect charges such as purchasing and receiving expenses, and storehouse and carrying charges, must be considered in arriving at a decision as to what constitutes the correct figure of cost.

Matters to be considered in determining the cost of work-in-process and finished products are legion. In fact, the whole subject of cost accounting is concerned. Just a few of the many subjects involved include: the treatment of scrap and by-products; overtime labor; the inclusion of interest as an element of cost; the basis for distributing overhead; idle plant capacity; and excessive spoilage.

Even when it has been definitely decided what items are proper charges to cost, the problem of establishing unit costs themselves must next be solved. The latter involves the treatment of sundry unit costs applicable to individual items of the inventory, or specifically, when material in the inventory is made up of quantities either purchased at different times at different prices, or produced at different times at different costs. This subject is discussed in subsequent paragraphs.

When comparison is made between cost and market in order to determine which is the lower, it should be remembered that for inventory purposes the cost of material which appeared in a previous inventory may be a different figure than actual cost. Cost for this material is the figure which was used in the previous inventory whether that figure was actual cost, market, or reproduction cost. Where the basis of valuation is cost or market whichever is lower, market or cost of reproduction as of the inventory date should be compared with the figure in the previous inventory.

In making a comparison between cost and market, cost for inventory purposes, with the exception of the instance mentioned above, means actual cost (or as near actual cost as can be calculated) and not reproduction cost or replacement cost, both of which unless specifically designated as such, are generally implied in the term "market."

Cost—*Merchandise, Raw Materials and Supplies.*—The cost of merchandise, raw materials and supplies, is generally made up of all or a portion of the following elements:

1. Invoice cost less all trade discounts.
2. Transportation charges and all direct expenses such as insurance, duties, tolls, special packing, etc. required for the safe laying down of the material at the desired point.
3. Cartage inward and handling charges.
4. In the case of material requiring special tools and equipment on the part of the manufacturer thereof, the ammortization of these tools unless this item is a part of the unit invoice cost. (For a fuller discussion of raw material costs see Chap. XX Operating the Material Ledgers—Prices.)

Some concerns treat cash discounts not as other income but as reductions to the cost of materials. To involve cash discounts in the inventory effects to show profits from operations greater than they actually are destroys the comparative feature of material costs, and acts to prevent the obtaining of useful statistical data.

If there is maintained a proper method of material control with its pivotal record—the material ledger—in an up-to-date condition, the cost of raw materials may easily be obtained whether the unit cost to be used is calculated by means of the arithmetical average method, the weighted average method, or the "first-in-first-out" method. These methods have already been discussed in a previous chapter.

When the above feature of good management and accounting control is not available it is perhaps the best practice (in fact it is required for tax purposes) to use the latest invoices and work back through them until the accumulated quantities of each item of material from the invoices equal the inventory quantity. These quantities from each invoice multiplied by the unit cost shown on each invoice (plus all proper direct and indirect charges) supply amounts which when added together represent the cost

for the quantity of material reported in the inventory. Dividing this total cost by the number of units supplies the average unit cost. As this procedure must be done for each item of material found in the inventory it involves a considerable amount of work if the inventory is made up of a large number of items of merchandise, raw materials, or supplies.

In certain instances raw material must be aged before it may be used. This aging process makes the material more valuable and as a result it is proper to increase the cost by the necessary carrying charges such as storage, insurance, and protection up to the point where it is available for manufacture.

Cost—*Work-in-process.*—First of all work-in-process should include only those materials which are intended to be sold as product. This, therefore, throws into a different classification all *construction* work-in-process at the time of the inventory, because the latter will, upon completion, be charged to some property account which by its nature is a capital item and not an item of inventory. Also excluded from the work-in-process section of the inventory should be plant repairs-in-process and experimental work-in-process. The former is chargeable into overhead under maintenance, and likewise the latter, although where the amount of experimental expense is abnormally large during an operating period it is not improper to carry a certain portion of it forward into the following operating periods as a deferred charge to be written off in accordance with a proper plan of disposition.

The cost of product still in the process of manufacture on the date of inventory is the amount expended thereon up to that time. Such amount is made up of material, direct labor, and factory overhead charges. *Defining* the elements that go to make up this cost and *obtaining* the cost of those elements are two distinct matters. Securing the latter is not so easy a task as in the instance of raw materials. This is particularly true if the concern lacks an adequate cost system, or indeed, has no cost system at all.

In a prior chapter the three principal elements of cost, so far as work-in-process and finished product are concerned, were discussed. Material, first of all, must be issued from stores and transported to the point of the first operation. Its removal from stores by means of a requisition originates the first cost charge, and the unit price for this material may arise as the result

of anyone of the following methods used in operating the raw material ledgers:

a. Arithmetical average method.
b. Weighted average method.
c. "First-in-first-out" method.

Since the Treasury Department for the purposes of income and profits taxes approves of the third method (*c*) in pricing raw materials at cost (there are several exceptions to this statement) it would appear that where either of the two remaining methods (*a*) or (*b*) is being used in the operation of the raw material ledgers that the material cost of work-in-process would have to be adjusted to the cost which would result were the "first-in-first-out" method used. Fortunately this has not been insisted upon for the reason that it would be an endless task to accomplish, especially for those concerns having a multiplicity of parts and assemblies, and where such parts and assemblies are represented by a number of lots, each one of which is in a different state of manufacture.

As a matter of fact, where raw material ledgers are being operated under the weighted average method and material is being charged into work-in-process on that basis, such unit material costs vary but slightly from costs under the "first-in-first-out" method—except in cases of substantial market changes. From a practical standpoint it makes little difference in the cost of material in work-in-process whether the weighted average method or the "first-in-first-out" method is used. The arithmetical average is used so seldom that it needs little consideration in the present discussion.

Work-in-process costs, where finished parts and assemblies are also classified as work-in-process, are generally obtained from cost sheets and worked material ledgers. Thus it is that the work-in-process inventory in practically all cases is a book inventory, whether the basis of inventory valuation is cost alone, or cost or market whichever is lower. However, when market is less than cost and where *process* costs are being obtained, it is not uncommon to value the work-in-process at market by adjusting the various elements of cost to market prices.

Where no cost ledgers, cost sheets, or cost summaries are kept for each lot, job, or order, cumulative operation cost sheets may be used to establish cost provided they have been subjected to a

reasonable check and verification. In addition, use may be made of engineering and manufacturing bills of material, which, if properly prepared, show the kind of material and the rough and finished weight of each material entering into each part. By use of this information, with due consideration given to the amount of scrap and average spoilage at each operation, together with the cost of such material (obtained by "working back" material invoices beyond the raw material inventory quantity to the work-in-process inventory quantity—although as explained above this generally involves quite a task) unit costs may be determined with reasonable accuracy provided overhead is correctly calculated and distributed. If it is the custom to treat income arising from the sale of scrap and spoilage as a credit to material cost, these matters should receive their proper consideration.

Cost—*Finished Product.*—The cost of finished product in the inventory is the total amount expended for materials, direct labor, and factory overhead required to manufacture it. The same consideration with respect to the various elements of cost as mentioned under work-in-process above should be given in the instance of finished product. In addition, where the quantity of a finished product is made up of quantities manufactured under different job or work orders the method used in securing the average unit cost must be one which furnishes the correct average unit cost. Thus is involved again consideration of the weighted average method or "first-in-first-out" method.

The unit cost of each finished lot, job, or order, can usually be obtained from the cost records. If there is no cost system or if the one employed is lame and the results are not dependable, it is then necessary to establish the estimated cost by treatment of the various elements in a manner similar to those described above in connection with the work-in-process.

Latest Cost or Average Cost.—If the entire quantity of any item of material in the inventory has been purchased or manufactured on the same purchase order or shop order respectively, or purchased or manufactured on different dates but at the same cost, the work of establishing the proper unit cost for inventory purposes is much easier than if conditions just the opposite to the above prevail. It will generally be found that cases of the former conditions are in the minority. Most items in an inventory are made up of material purchased or manufactured on two

or more purchase orders or shop orders—and at varying prices. Thus an additional feature is inserted for solution in determining proper unit costs. Let the following be assumed:

An inventory on Dec. 31, 1924, included among a great many other items, 400 side-brackets. The material ledger record showed that the inventory on June 30, 1924, was 300 priced at $1 each and that the following were the purchases subsequent to that date:

Date	Quantity	Unit Cost	Total
July 12	200	$1.10	$220
Sept. 15	200	1.15	230
Nov. 8	300	1.25	375

In this particular case, the problem is to determine what unit cost is applicable to the 400 brackets in the inventory. Should the unit cost be $1.225 established as follows:

$$\begin{array}{rrr} 300 & @ \$1.25 = & \$375 \\ 100 & @ \quad 1.15 = & 115 \\ \hline 400 & & \$490 \end{array}$$

$$\frac{490}{400} = \$1.225 \text{ each,}$$

or should the unit cost be arrived at by the use of average costs (a figure which in this particular instance would be less than $1.225 due to the influence of the lower costs of the opening inventory and subsequent purchases)? In other words it is a question of which unit cost is the more correct to use—average cost or latest cost.

The answer to the question is simple. Use the unit costs as are shown on the material ledgers—provided of course that these ledgers are accurate. If the weighted average method is used in the operation of this record use the unit costs resulting therefrom —average costs; if the "first-in-first-out" method is employed the unit costs will be latest costs. These two methods of operating material ledgers have already been discussed at some length in a preceding chapter. If there are no material ledgers then the use of average costs is out of the question and latest costs must be utilized.

Because the greater majority of concerns find it more practicable to use average costs for their material ledgers is no reason for assuming that such costs are more representative than latest costs. In fact during normal periods there is very little to choose

from between the two. However, when prices are dropping, latest cost will show a unit cost *under* average cost because the latter is maintained at a higher level through the earlier but higher prices. On the other hand when prices are rising latest cost will be *greater* than average cost.

It is easy to see from the above that when prices are dropping latest costs are more conservative costs for the inventory; when prices are rising conservatism in pricing is in favor of average costs. From this statement it is not to be inferred that latest costs must be used if the former condition exists and average costs if the opposite conditions exist. On the contrary, it is a matter of accepting and using those costs furnished by the material ledgers provided they are used consistently. It is not difficult to see that consideration of the merits of these two costs is confined to that part of the inventory represented by raw material and finished product only. Work-in-process necessarily must be priced, as far as cost is concerned, at its present or latest cost.

Market—*General.*—In normal times, as previously stated, costs so closely approximate market prices that in most cases very little consideration need be given to the latter. For all practical purposes it may be assumed that *cost* and *market* are in agreement. However, when prices are being subjected to considerable change, especially downward, it is of vital importance that market prices be determined accurately and in accordance with existing conditions. To do this is generally not an easy task especially in the instance of merchandise which has passed its season, or in the case of work-in-process and finished product inventory of those manufacturing concerns using the job-order method in obtaining costs.

Whatever the case may be, certain cautions must be exercised in establishing correct market prices. First of all the use of market price implies that the condition of the merchandise or material on hand is equal in standard to the merchandise or material for which market prices are available. This means that if the merchandise on hand is not of a quality on a par with merchandise offered in the market, nor of the same desirability, then market for inventory purposes should be lower than the generally accepted market.

The term market for any item of inventory is generally taken to mean the amount of money that would have to be expended to

replace it, such expenditure being computed on prevailing current prices. Thus, market must include not only purchase market but also cost of reproduction. The former applies in the case of raw material and supplies of manufacturing concerns and of merchandise of the trading concern; the latter is applicable principally to work-in-process and finished product of manufacturing concerns. Market in certain cases is too restrictive a term satisfactorily to cover the subject of valuation. Quite often values for various inventory items can only be established, not on the basis of cost or cost to replace, but on the basis of net selling value, or again on the basis of use value, two valuations which bear no relation to replacement costs. With these exceptions the word "market" expresses as well as any the cost of replacing the inventory at prices prevailing as of a certain date.

Market price to one concern is not necessarily market price to another. It is quite apparent in certain lines that quantity has no small effect upon price. For example, the purchase by one concern of 1,000 units affords it a better price than the concern purchasing but 10 units can obtain. At the same time the size of the quantity desired generally determines the source from which the raw material or merchandise can be secured, and this in turn has its effect on market prices for the inventory. Market price for a large quantity of material purchaseable from the manufacturer will necessarily be lower than market price where a small quantity of the same material is purchaseable only from a retailer. For the above reasons, therefore, published market prices should be used with due caution. Consideration should constantly be given to those factors which make imperative the use of a higher or lower market price than published market price, and yet be the price best expressing value to a particular concern.

Many times it is not possible to determine any market price. This is particularly true in retail establishments in connection with merchandise which is seasonable, or merchandise which has been purchased to meet the demands of a fad or style which has or is passing. The value of such merchandise is entirely dependent upon future demand; if no demand develops the only value that attaches to it is the net price secured in forced sale.

What has been said above with respect to certain portions of the inventory of the retailer likewise applies in the instance of the manufacturer. The latter quite often finds certain portions of

his inventory for which there is no market price—either purchasing market or selling market. The inventory of the manufacturing concern, however, is in certain respects different from that of the mercantile concern. Whereas practically the entire inventory of the retailer is in the form of goods ready for immediate sale, the greater portion of the manufacturer's inventory is generally represented by raw materials and work-in-process. As a result, the lack of market prices on the part of the manufacturer is not so seriously felt as in the case of the retailer. This is so because the former, many times, is able to work such items into finished and salable goods. In most cases it is not possible for the retailer to do this.

Market—*Merchandise, Raw Materials and Supplies.*—Market prices for merchandise, raw material, and supplies may be obtained from the following sources:

1. Trade papers.
2. Standard price lists.
3. Invoices and purchase orders.

If reference is made to any one of the present large number of trade papers there will usually be found therein current market prices of those materials used in the special trade to which the paper is directed. Standard price lists, too, are a source of market information, but not by themselves alone for it is necessary in using such lists to refer to and employ the trade discounts prevailing at the time. Not only are market prices obtainable from the sources mentioned above, but in the case of produce and local commodities they may be secured from newspapers. Whichever of the three sources is used care should be taken not to accept general market prices as representing market prices to the concern whose inventory is being valued. As previously stated, the quantity of any material purchased is in most cases the principal factor in determining what its cost of replacement will be.

Practically, there is no better source to refer to for market prices than purchase orders or invoices of vendors—provided such documents are of a date which coincides very closely with the inventory date. Unfortunately, where purchasing is spread evenly over the entire operating period—and this is generally the rule—such a small percentage of material is purchased around or about the inventory date that the use of the latest invoices

or purchase orders for all items of material hardly allows the inventory to be expressed in terms of market prices. The lapse of time between the date of the last purchase and the inventory date may be so great that quite a fluctuation in prices may occur between market at the time of purchase and market on the inventory date. In very few cases is it possible to use one source of information exclusively for the purpose of establishing market prices. Market prices for certain items of inventory can best be obtained from trade papers; the market prices of other items are more representative if secured by the use of standard price lists; and in other cases the latest invoices or purchase orders will furnish the most dependable market figures.

Whenever raw materials are inventoried at unit prices which are less than cost, these same prices should be used in setting up the values of material in the work-in-process and finished goods inventory.

Market—*Work-in-process.*—In practically every instance "market" for work-in-process is its cost of reproduction. It is quite the exceptional case when there is a purchase market for any kind of work-in-process, and when such does happen, establishing market prices is quite similar to the process used in determining market for raw materials.

So-called market for work-in-process is established by estimating what the cost of reproduction would be if all items in the work-in-process section of the inventory were again manufactured, but on the basis of prevailing prices for materials, labor, and overhead. In most cases it is not a difficult matter to estimate quite accurately the direct material and direct labor cost of reproduction. It is with respect to overhead that difficulty arises. It is safe to say that in most cases the greater portion of overhead is made up of indirect labor. The next item in importance making up the total overhead amount, is usually that of indirect materials—supplies for operating and maintenance. In these two instances, especially where a detailed schedule of all items constituting overhead is available it is possible to estimate reasonably close, by percentages, the increase or decrease of probable future costs of this kind. Fixed charges and service charges will be found in most cases to remain fairly constant.

There are few cases in practice where the above procedure is attempted unless perchance the concern is operating under a

process cost method. Generally, since work-in-process represents recent effort the actual cost thereof approximates cost of reproduction very closely and for all practical purposes even in times of price fluctuations the former is used as representative of the latter for inventory purposes. There is one criticism with respect to this procedure and that is where the material cost of work-in-process is a large percentage of its total cost and where prices have fallen. In this case the cost of reproduction will be much less than actual cost, for the reason that the material in process at the time of the inventory may have been purchased some considerable time prior thereto and at a much higher price.

Market—*Finished Product.*—What has been said above with respect to work-in-process likewise applies in the case of finished product. First of all there is seldom a comparable purchase market. Thus, market for finished product should be taken to mean cost of reproduction. If the finished product is of recent manufacture, actual cost will not vary a great deal from cost of reproduction and the former may be used and is generally used as a market for inventory purposes. If a considerable portion of the finished product has been on hand for some time then the above statement will not hold true especially when prices are declining. In such cases actual cost will be higher than cost of reproduction and an inventory priced on the assumption that actual cost and a cost of reproduction are in agreement, or nearly so, would result in an inflated figure.

Cost or Market Whichever is Lower.—This basis for inventory valuation is the most generally accepted basis. It requires first of all the establishment of the actual cost and the market value of each separate item in the inventory. As practically applied this basis then calls for the use of (*a*) cost, if market value is greater than cost, and (*b*) market value, if such value is less than cost. The employment of this procedure accomplishes two principal results:

1. It places a conservative value on the inventory for balance sheet purposes.
2. It affords the establishment of correct profits of the past period and prevents the subsequent period from being charged with an inventory of excessive valuation, which in turn avoids penalizing the profits of one period with the actual or estimated losses of another.

Whereas the most accepted accounting practice generally requires that the inventory be priced at market—if market is less than cost—it does not favor the apparently logical reasoning that when market is greater than cost, that market values be used instead. Although it may be the case that there is just as great a possibility of additional profits being realized in the subsequent period as a result of the increase in market value of the inventory over its cost as there is in the possibility of loss due to a decline in market values, yet this so-called anticipation of profits is not countenanced by best practice. On the other hand, loss in inventory due to market decline may or may not actually occur, but if there is any reasonable indication that it may occur, such expected loss should be charged against the current period. Should the decline in market be but temporary the following period will naturally benefit to the extent of being charged with an opening inventory the value of which will be greater than the value placed upon it for prior period accounting.

Whether that which is expected to happen does so or not, it is the best and safest practice, when market is less than cost, to establish the inventory on a conservative basis and to charge the difference between inventory valuation and cost against profits of the current period.

In comparing cost with market the basis should be a fair and comparable one, *i.e.*, any costs which are not a part of market price should be added to market before the latter should be compared with the former. This is important to remember for to ignore it may lead one into using prices which undervalue the inventory. The mere fact that a comparison between cost and market discloses the fact that the latter is the lower does not of itself mean that market must necessarily be taken as the most conservative valuation. If the condition of the market is only temporary and all indications point to its early recovery and if sales demand for finished product has not fallen off, it is not improper to use cost as a basis for valuation. Should there be any doubt however as to the recovery of prices, conservatism dictates that market be used instead of cost.

While the use of cost in pricing the inventory when market is higher than cost does not furnish a true valuation of the inventory for balance sheet purposes, it at least prevents the taking of profits resulting not from regular operations but from features

which are in many cases speculative. At the same time the use of cost figures furnishes an inventory amount for the balance sheet the valuation of which there is not the slightest doubt. When the rise in market prices over cost is slight or when the rise is considerable, but to all reasonable appearances but temporary, the employment of cost not only fulfills the requirements of conservative valuation but at the same time supplies a figure which, for all practical purposes, may be said to represent true valuation. It is only when market is higher than cost, when prices are still rising, and where dependable forecasts point to market increases that will have a permanency at least of such duration as to allow the liquidation of the present inventory, that a question can arise as to the undervaluation of inventory as a result of using cost figures.

Cost of Reproduction.—It has been stated that under the "cost or market, whichever is lower" method, cost is compared with market and the lower figure taken for pricing purposes. Unfortunately this statement is too general for practical applications because *market*, as used, includes things other than just market prices. Cost of reproduction, for example, is included in the term "market" above and yet it may be quite a different figure than market—provided there is a market price. This is particularly true in the case of the work-in-process and the finished product of a manufacturer of a patented article. It is not difficult to see that, first of all, there is little chance of a purchase market for work-in-process, and certainly no purchase market for the finished product.

Even where a concern is making a product manufactured or produced by other concerns it may be that the former concern, through methods of production enjoyed by itself alone, has a cost of reproduction which is decidedly lower than market—especially since market includes the element of profit.

Cost can be compared with market in the greater majority of instances in the case of mercantile concerns, but the same cannot be said for manufacturing concerns. In the case of raw materials, manufacturing concerns can generally make a comparison between cost and market, but for work-in-process and finished product the comparison should be made between actual cost and cost to reproduce. The cost of reproduction should be computed on the basis of market prices for raw material, prevailing on the date of the inventory plus estimated labor and overhead

costs during a period of sufficient length to reproduce the present physical inventory of work-in-process and finished product. Practically the labor rates and overhead rate prevailing as of the time of calculation of cost reproduction are used instead. The following sums up the above:

1. That the word "market" for purposes of general definition includes "cost of reproduction."
2. That in practical application "market" may be, and often is, quite a different figure than cost of reproduction. Therefore the two terms should be distinguished in practice.
3. That while actual cost may be properly compared with market prices in instances of merchandise of merchantile concerns and raw materials of manufacturing concerns, it may not generally be so compared in the instance of work-in-process and finished product of the latter concerns.
4. That in these two cases the proper comparison is that between actual cost and cost to reproduce. This latter figure may be the only figure that can be compared with actual cost. If there is actually a market price it may be higher or lower than market cost to reproduce.

Valuation at Cost.—Many inventories are priced, not on the basis of cost or market whichever is lower—the most generally accepted basis—but on the basis of cost alone. While superficially it might appear that the use of such a basis would result in incorrect inventory values, such is not the case except, possibly, when conditions are abnormal and stock turnover slow. Under normal conditions replacement costs, selling prices, and selling costs do not ordinarily fluctuate to such an extent that the use of cost for pricing overvalues the inventory. In other words during normal times cost approximates market very closely, and more especially if there is a uniform and rapid stock turnover of merchandise and material. It is well known that most concerns who use the "cost or market whichever is lower" basis, price their inventories during normal times on the basis of actual cost.

It is during abnormal times when prices are either unstable or abnormally low or inflated, that the use of cost alone as a basis for valuing inventories is unreliable. Where the actual cost of the merchandise or material on hand is greater than the present market or replacement cost, use of actual cost would establish an inventory figure of questionable value since it may happen,

and quite often does, that in the ordinary liquidation of the merchandise not even cost is recovered to say nothing of a profit no matter how small. In such cases the only safe value would be market value. And yet even this might be incorrect to use, especially if all indications pointed to a still further decline in prices. On the other hand, where market or replacement cost is higher than the actual cost of the goods on hand, use of actual cost may result in a false statement of value although on first consideration it may appear to be the most conservative basis to use. This is particularly true if not only market but also actual cost is inflated, and it appears that all prices are due for a material slump within the space of time required to liquidate the present inventory.

Generally speaking, costs by themselves will furnish quite reliable valuations during normal times. In periods of abnormal conditions, however, it will be found that a more inclusive basis than cost must be employed if the inventory is to be priced so as to show a valuation which is reasonably conservative.

In the case if raw materials and supplies which have been acquired very close to the date of the balance sheet, cost will generally be in approximate agreement with market prices. Values established by the use of cost, therefore, will be conservative unless the market prices are moving downward. Generally speaking it will be found that the major portion of the raw material inventory has been purchased on dates too distant from the date of the balance sheet to have actual cost thereof approximate market prices. During periods of depression price movements between purchase dates of raw material and the inventory date are usually of such moment that the use of cost as a basis for pricing results in extremely questionable valuations. What has been said here in connection with raw materials and supplies of manufacturers also applies in the case of merchandise of mercantile concerns.

Many times goods-in-process are priced at cost, although market (or more correctly, reproduction costs, in this case) is the proper basis to use. This applies particularly to certain manufacturers who use the job-order method of cost finding and not to manufacturers who use process-cost methods. The use of actual cost instead of reproduction cost is due to the difficulty in determining the latter. Sometimes it happens that the actual cost of goods-in-process approximates the reproduc-

tion cost, but if prices are tending downward it only occurs if the following conditions are present:

1. The period of processing the product must be a short one, and the raw material used must be of recent purchase.
2. Raw material cost must be but a very small part of the total cost, and the fluctuation in price between actual cost and market must have no noticeable effect on total cost. At the same time labor rates must not have changed since work was started on that part or assembly in the inventory which has been processed the longest.

From the above it will be seen that if labor constitutes practically all of cost and if labor rates have not increased, reproduction cost should approximate actual cost very closely even in times which are not normal. This is especially true if the period of processing is a short one. On the other hand, if a substantial portion of the cost of goods-in-process is made up of material purchased sometime previous to the inventory when prices were higher than present prices, then actual cost exceeds reproduction cost and if used, inflates the value of the inventory to the amount of the excess.

What has been said above in connection with goods-in-process likewise applies to finished goods. In times of diminishing values actual costs for finished goods are very seldom reliable prices to use for conservative valuation. However this may be, some concerns use actual cost instead of reproduction cost because of the great difficulty in securing the latter. As previously stated such cases are chiefly confined to concerns which use the job-order method of cost finding and where a very large number of parts and products are produced. Concerns using the process-cost method should have little difficulty in establishing reproduction costs provided their regular costs are accurate.

Valuation from Sales Prices.—Whether an inventory is to be priced on the basis of (*a*) cost, or (*b*) cost or market whichever is lower, selling prices are oftentimes used in place of either cost or market for certain items of the inventory. Such selling prices should be net selling prices, that is, the actual selling price (or as close a figure to actual as can be estimated) less the sum of the cost of selling, carrying charges, and expense of delivery, where the latter is a part of the consideration of sale.

When any item of the inventory is valued on a net sales basis the latter basis should be employed only when it is *less* than both cost and market. Otherwise the inventory will be inflated

through the anticipation of a profit not yet earned. In certain exceptional instances, however, net sales prices which are *higher* than cost or market may be used but only under certain limitations. These will be considered later. Generally, use of net sales prices as a basis for inventory valuation is confined to the following instances:

1. *Where there is a permanent loss in the value of merchandise or finished product as the result of lack of demand, and net sales prices fall below both cost and market.* Whatever may be the cause or causes for such lack of demand, if a part of the inventory held ready for sale cannot be sold in the ordinary manner its value may decrease to a point which is less than either its actual cost or its replacement cost. Quite often this reduced value can only be compared with actual cost because, lacking a selling market, there may be no purchasing market and hence no market prices. This is not true in all cases for it is possible at times to make a comparison between not only cost but also market. Such value as does attach to merchandise under such conditions is measured (provided the merchandise can be sold at a price) by the forced selling price less all expenses of selling—an amount which is actually the *net* amount realized. The forced selling price is a difficult one to estimate in view of the fact that it is usually what the purchaser cares to offer and not what the seller desires to obtain. This latter statement is not inflexibly true, since the extent of the influence of the purchaser is only in direct proportion to the general lack of demand for the merchandise in the ordinary course of business. If it appears that the lack of demand is only a temporary condition (and especially if the portion of the inventory affected is not a large one, nor the total effect important) and if it also appears that net realization values will very soon return to the level of actual cost, unit prices may be taken on the basis of the latter. The only fault with this procedure is that with respect to the dependability of the forecast applicable to the recovery of prices. Should there be any question as to the recovery of prices conservative practice would dictate that such forecasts and assumptions be ignored and the inventory priced at net sales prices, provided such prices are lowest.

2. *Where the only practical basis available for pricing is the selling price.* This procedure most commonly applies in the instance of scrap materials, by-products, and residual products. Also, in certain industries, oil refining for example, the prices used for the various products constituting the major portion of the inventory are established by working back from the average net realization amount.

Because of the many ways in which scrap material may result it is almost a hopeless task, and in many cases an impossible one, to obtain the cost thereof. In most instances the only practicable way

to value scrap in the inventory is to use an estimated net realization price, the latter based on the prevailing market prices for similar scrap at the time. In the case of by-products it is not uncommon for certain industries to figure the cost thereof and to use these costs for inventory purposes. In other industries it is difficult to compute costs on by-products with the result that the value is arrived at in the same manner as scrap above, *i.e.*, on net realization basis.

If upon comparing the current purchase cost or the reproduction cost of any item of finished product or merchandise with the selling price it is found that the latter is the lower figure of the two, it is not correct even then to use the full selling price for valuation purposes. The unit valuation to use should be a still lower figure and should be determined in the following way:

1. Deduct from the present selling price the estimated expenses to sell. Also, deduct estimated delivery expenses when the selling price includes this service.
2. In addition, deduct all carrying charges which it is estimated will be incurred before the sale is made.
3. Give consideration to:
   a. Trend of market—whether selling prices will increase or decrease.
   b. Increase or decrease in selling expenses.
   c. Increase or decrease in carrying charges.

The net selling figure established as a result of the above should be used for inventory purposes if it is less than both cost and market. To use gross selling price without consideration to proper deductions, inflates the inventory valuation and throws a burden on the subsequent period.

The two net sales bases for inventory valuation above not only apply in the instance of where the policy of conservatism prevails, but they likewise apply where the policy is that of showing the inventory at its so-called true value. The attempt to establish true inventory valuation sometimes calls for the consideration of a third basis—the use of selling prices for certain parts of the inventory when such prices are *higher* than cost or market. Superficially this procedure might appear to conflict with good accounting practice through the anticipation of unearned profits, but consideration of the following qualifications may tend to offset such appearance. Where net sales prices for inventory purposes are higher than cost or market, they should only be used for balance sheet purposes under the following limitations:

1. The portion of the inventory so priced must be merchandise or finished product in a salable condition, and it must be covered by a sales order or contract signed by a truly responsible purchaser. The chance of cancellation of the order or contract for undelivered goods must be remote. Should there be any doubt as to cancellation, that portion of the inventory *apparently* sold should not be valued at net sales price.

2. The portion of the inventory priced at net sales prices must be separated into two parts for both balance sheet and income statement purposes. The first part should be the value of the merchandise or product priced at cost or market whichever is lower; the second part should be the amount of profit yet unrealized.

The purpose of the first limitation is to prohibit the inflation of the inventory and the taking of profits before they have been earned. If goods have actually been sold but delivery has not been made for one reason or another, there is nothing wrong in valuing such goods at net sales prices even if higher than cost or market if the possibility of cancellation of the sales orders or contracts is far removed, and if the total inventory value is shown in the manner as designated in the second restriction. While this procedure is one which can hardly be condemned as poor practice, yet cases where it is used are few and far between. The more conservative method, pricing at cost or market whichever is lower, although not necessarily the more correct method in such particular cases, is the one generally employed.

Value Determination Subsequent to Inventory Date.—As inventories must necessarily be priced subsequent to the inventory date the question sometimes arises as to the justification of allowing market and sales information secured after the inventory date to influence the unit values used for inventory pricing. The question is not an important one where the basis of pricing is cost alone, nor where general conditions are such that pricing on the basis of cost or market whichever is lower amounts substantially to a cost basis. In such cases unit cost prices are generally prepared in advance of the inventory date in order to allow the total inventory figure to be obtained as quickly as possible.

Where market prices and net sales prices are used for valuation purposes, however, such prices should be established, not only by the use of the market prices and estimated net sales prices on the inventory date, but also by the use of the market

prices and actual sales figures obtainable after the inventory date but prior of course to the date of final preparation of the balance sheet. Although the above brings about a condition whereby the quantity of the inventory is set up as of one date and its valuation determined as of another, practically, this procedure effects to make the inventory valuation more correct—especially so with respect to that merchandise or product which has been sold since inventory date. In such latter cases estimated values become definite values for the inventory.

Valuations Less than Actual Cost or Replacement Cost.—It is the exceptional inventory which does not contain items of merchandise, materials, or supplies, the present values of which although less than actual or replacement costs yet are higher than scrap values. Whatever the cause or causes may be certain inventory items will be found to have depreciated in value to a point which calls for special treatment in arriving at correct unit prices. The easiest solution—putting such items in the inventory at scrap value—is not always the correct solution although it is the most conservative treatment of all. To write down such items to the value of scrap when there is reasonable possibility that higher than scrap values will finally attach themselves to such items at the time of their sale, would be overdoing conservatism. Especially so if the amount involved is considerable.

It is quite apparent that each instance must be handled on its own individual merits and that no set formula can be used which will produce a unit price representative of a fair value. The following practice, however, may help in determining such values for inventory purposes:

1. Material, merchandise, or supplies that are permanently obsolete should be valued at scrap prices.
2. Material, merchandise, or supplies *not* permanently obsolete should be treated in one of the two following ways:
   a. If the total amount involved is not great the material should be valued at scrap prices.
   b. If the total amount involved is considerable the material should be valued on the basis of either known or estimated demand, with due consideration given to the length of period within which the material can be maintained at its proper qualitiy, or to the maximum length of time that it is to be kept in stock.

Inventory at Cost—Determining Cost of Goods Sold Correctly.—If the cost of goods sold is determined by adding to the

opening inventory the purchases and all other proper costs of production during the period, and subtracting from this total the closing inventory, then the latter should be priced at cost if the cost of goods sold and also gross profit for the period are to be correctly determined. Should the inventory be priced at values lower than cost, the cost of goods sold, as determined in the manner above, will be increased by an amount estimated to represent the loss in value of the inventory due to market or other conditions at the end of the operating period, a loss which rightfully cannot be said to have increased the cost of the goods already sold. Although to do so is obviously wrong, yet it is the practice of most concerns to charge into the cost of goods sold the entire difference between physical inventory (on whatever basis it is valued) and the book inventory.

When times are normal and the value of the inventory practically coincides with its cost no great harm is done. But when market is below cost and inventories are priced at market value, the cost of goods sold is thus increased by an amount which should more correctly be treated as an item distinct in itself and chargeable to a separate account under a title such as "Loss Incurred in Adjusting Inventory to Market." This loss is usually absorbed in the period of which the inventory date is the closing date and although it should be treated as a direct charge against profits of the period rather than an increase to cost of goods sold the latter practice is the more common but less correct one. The reason for this is due principally to two things:

1. Lack of appreciation as to the effect of inflating the cost of goods sold, and at the same time mixing in one account items of an entirely different nature.
2. To avoid the necessity of having the inventory priced, totaled, and summarized more than once, as would be required when market is less than cost and the basis used, is "cost or market whichever is lower."

As an illustration of the above the following figures may be considered:

Inventory—Jan. 1, 1924	$1,500,000
Purchases during 1924	500,000
Production Costs (other than materials) during 1924	2,000,000
Total	$4,000,000

The closing inventory Dec. 31, 1924, priced at cost is $2,750,000; and priced at cost or market whichever is lower, $2,500,000 Using the cost inventory the actual cost of goods sold would appear to be $1,250,000, the difference between the amount to be accounted for ($4,000,000) and the closing inventory at cost ($2,750,000). This amount of $1,250,000 would not agree with the *actual* cost of goods sold as established during the operating period by the use of unit cost figures because of the usual physical shrinkage in inventories due to breakage, spoilage, leakage, pilfering, etc. Theoretically this shrinkage is not a direct charge to the cost of goods sold. It is a part measure of the lack of material control.

For practical purposes, however, such loss is absorbed in the period in which it occurs and is generally so treated as to increase the cost of goods sold. Should this loss not be entirely absorbed in the period in which it has occurred it will usually find its way into the overhead with the result that finished and work-in-process inventory at the end of the period will carry a portion of such loss into subsequent periods. Best practice dictates that the loss be absorbed in the period in which it takes place. Whether it is made a part of the cost of goods sold during the same period or a direct charge against the profits is another matter. Generally as stated above, it will be found that most concerns include this loss as a part of the goods sold. So much for the inventory priced at cost.

Using the closing inventory priced at cost or market whichever is lower, or $2,500,000 gives a figure of $1,500,000 which without further analysis might appear to be the cost of goods sold. Actually, this figure is made up of two parts, $1,250,000 representing the cost of goods sold (although as stated above the treatment of this entire amount as cost of goods sold is many times questionable) and $250,000 representing loss incurred in adjusting the inventory to market values. The latter item certainly is not an additional charge to the cost of goods sold. It should be kept separate and made a direct charge against the profits of the period.

Unfortunately, where the "cost or market whichever is lower" basis is used, and market is less than cost, the total amount of the inventory so established is deducted from the total amount to be accounted for, *i.e.* the opening inventory plus purchases plus all other proper production charges, and the remainder is

considered as cost of goods sold for the period. The two reasons why this is usually done have been stated above. However, if figures are to be obtained which will correctly tell the story in accordance with actual facts, then it is necessary that items of different nature be at all times kept separate and distinct from each other. If this better practice in accounting is to be secured then it is necessary in establishing the cost of goods sold through the method ordinarily used, to have the entire inventory priced at *cost* even though for balance sheet purposes the basis of inventory valuation is cost or market whichever is lower.

Valuation of Inventories in Foreign Countries.—Inventory of merchandise in foreign coutries must be so valued that when combined with domestic inventory figures the total will represent a conservative valuation for the entire inventory. There is no great difficulty in determining conservative valuation for foreign inventories. The same rules that apply in the instance of domestic inventories likewise apply to foreign merchandise, the only additional feature being the consideration of the rate of exchange.

Foreign inventories are usually valued on the basis of cost or market whichever is lower. The smaller figure for each item of merchandise is taken and multiplied by its respective quantity. The total conservative valuation of the entire inventory is then determined in terms of the foreign currency and the latter reduced to its equivalent in domestic currency by the application of the rate of exchange prevailing on the date of the balance sheet.

Where the inventories are those of foreign subsidiary companies then they are valued in terms of domestic currency when the balance sheets of the foreign subsidiaries are converted by the application of the prevailing rates of exchange and then consolidated with the balance sheet of the domestic parent company. In such cases it is assumed that the inventory valuations in terms of foreign currencies are conservative valuations—that cost and market of each item prevailing in the foreign country on the date of the balance sheet have been compared one with another and the lower of the two selected. The same rules which apply in selecting conservative unit prices for domestic inventories as described in the preceding pages, likewise apply in the instance of foreign inventories.

Inventory Reserves.—Adjustment of the valuation of the total inventory from cost to a figure lower than cost may be accomplished by either of the following two methods:

1. Pricing each individual item in the inventory at cost or market whichever is lower. The total of the extensions of all items so priced is the conservative valuation of the inventory, and the difference between this valuation and the book valuation at cost is the adjustment amount.
2. Establishing the amount of difference between the book valuation of the inventory at cost and its conservative valuation, and creating a reserve which is a measure of shrinkage in value. The amount of this reserve is deducted from the book inventory figure on the balance sheet.

Of these two methods the second is the unusual method since most inventories are established by totalling the value of each item constituting the inventory after they have been adjusted to conservative values—individually. Valuation by this method—the first method above—has already been discussed in the preceding pages of this chapter.

In theory it is a very simple matter to establish a reserve by means of which the book inventory may be adjusted to a conservative value on the balance sheet. An amount purporting to represent the loss in inventory valuation is first determined. Profits are then charged with this amount and an adjusting reserve created on the books. When the balance sheet is prepared this reserve is shown on the asset side of the balance sheet as a deduction from the gross inventory figure. In practice however, there are three principal faults to be found with respect to the use of a reserve for revaluation purposes:

1. The amount of the reserve is usually inaccurate.
2. It is difficult to satisfactorily dispose of such a reserve in the following period.
3. Costs in the following period are complicated.

Provided the amount of the reserve so created is accurately calculated, it makes little difference so far as the balance sheet or operating results of the past period are concerned whether the inventory is adjusted by means of individual items or a reserve. Generally however, the same care employed in setting up the values of individual items is not employed in the instance of the reserve. Thus it is that in most cases reserve amounts are rough estimates based upon flat percentages of the entire

inventory, or portions of the entire inventory. Inventory valuations as a result cannot be accurately stated. While it is possible that the valuation established by the revaluation of each individual item may also be incorrectly stated the chance of error in such cases is far less than when reserves are employed to effect adjustments.

The next fault with the reserve method is the difficulty of satisfactorily disposing of the reserve amount created. If the amount is the result of the application of a flat percentage to the cost of the entire inventory no great problem has to be solved in disposing of the reserve. By applying the same percentage to the gross cost of goods sold each month the reserve can readily be charged with amounts which will dispose of it in due course. Off-sets to the reserve charges will be credits to the cost of goods sold.

Should the reserve amount, however, be established by the use of a number of percentages or by accurate computation paralleling closely the amount of adjustment which may be determined by the use of individual item values, then the disposition of the reserve amount on a fair and equitable basis in the subsequent operating period is a difficult task.

The third objection to the use of a reserve for adjusting the inventory in aggregate is that individual costs in the following period are confused. When using the reserve method the original costs of individual items are left undisturbed, and if these unit costs are used in the subsequent period they must be reduced at the time of their use to their inventory value if cost accounts are to be accurately maintained and if the inventories controlling accounts are to be accurately and properly supported.

From the accountant's standpoint it is much easier to adjust the inventory to its conservative value by means of a reserve than to consider each item of the inventory separate. As explained previously it makes no difference for balance sheet purposes which method is employed, but it does make a decided difference in the following period when the reserve must be disposed of on a proper and fair basis and costs accurately determined. Cases where reserves are used are the exceptional ones because practically all inventories are revalued as a result of the treatment of individual items making up the entire inventory.

CHAPTER XIV

RELATION OF INVENTORY TO FEDERAL TAXES

The importance of correct inventories for income and excess profits tax purposes is not to be denied. Of the many features involved in establishing taxable income no other one demands more careful consideration and handling than the inventory. And for two reasons: first because most concerns use inventories in order to determine the results of operations for the year; and second, because no other accounting item involves so many difficult problems as are associated with inventory valuation.

Other things being equal, overstating the inventory results in fictitious profits to the extent of the overvaluation; understating the inventory results in too small an amount of earnings to the extent of the undervaluation. The big problem in the matter of inventories is that of securing and applying correct unit prices.

If a concern so desires, it may elect to price its inventory on any basis and in any way or manner it sees fit to adopt—this for its own use. But when it comes to the use of the inventory for determining income, taxable under the various income and excess profits tax laws, the basis of valuation must conform to the regulations and rulings laid down by the Treasury Department. It is the purpose of this chapter, therefore, to take up and discuss these rules and regulations, and to trace their development through the respective revenue acts.

Federal Income Tax Laws.—Before proceeding with the regulations, rulings, and decisions under each of the income tax laws so far as inventories are concerned it may be well to list these laws, showing the periods during which they have been effective.

1909 *Law.*—The Act of Aug. 5, 1909. Effective from Jan. 1, 1909 to and including Feb. 28, 1913, when the 1913 law became effective. This law although an excise law (the sixteenth amendment to the Federal constitution had not been passed at that time) was commonly taken as an income tax law.

1913 *Law.*—Passed Oct. 3, 1913. Effective from Mar. 1, 1913 to and including Dec. 31, 1915, when the 1916 law became effective.

1916 *Law.*—Passed Sept. 8, 1916. Effective from Jan. 1, 1916 to and including Dec. 31, 1917. Known as Income Tax Act of Sept. 8, 1916.

1917 *Law.*—Passed Oct. 3, 1917. Effective from Jan. 1, 1917 to and including Dec. 31, 1917. This law was in form a series of amendments to the 1916 Law. Hence the 1916 Law and 1917 Law were both effective for the entire calendar year 1917. Known as War Income Tax Act of Oct. 3, 1917.

1918 *Law.*—Passed Feb. 24, 1919. Effective from Jan. 1, 1918 to and including Dec. 31, 1921 (with some minor exceptions between Nov. 23, 1921 and Dec. 31, 1921). Known as the Revenue Act of 1918.

1921 *Law.*—Passed Nov. 23, 1921. Effective (with some minor exceptions between Nov. 23, 1921 and Dec. 31, 1921) from Jan. 1, 1922 to and including Dec. 31, 1923. Known as the Revenue Act of 1921.

1924 *Law.*—Passed June 2, 1924. Effective (with some minor exceptions) from Jan. 1, 1924.

Regulations and Rulings.—Income tax laws in a manner similar to other laws require rules and regulations for proper administration purposes. Under the Federal income tax laws it is the duty of the Commissioner of Internal Revenue to make and promulgate such regulations. The law states:

> That the Commissioner (*of Internal Revenue*[1]) with the approval of the Secretary (*of the Treasury*[1]), is hereby authorized to make all needful rules and regulations for the enforcement of the provisions of this act.

Such rules and regulations with respect to each section of the law are published by the Bureau of Internal Revenue from time to time under the title of "Regulations" designated by serial numbers such as "Regulations 33," "Regulations 45," etc. These regulations as a general rule may be said to have the force and effect of the law under which they have arisen. Due to the vast number of cases to which these regulations apply it is only natural that cases arise now and then when the application of the existing regulations works extreme and unfair hardship upon certain taxpayers. In deserving cases new rulings and decisions have been made which either supplement or broaden the interpretation and application of the existing regulations. Such new rulings and regulations as are made by the Treasury Department from time to time generally supersede all prior regulations and rulings and are retroactive to the date when the law became effective. It is especially well to keep this point in mind in giving

[1] Author's supplement in italics.

consideration to the extracts of the regulations reprinted in the following pages. In some cases, however, this feature of retroactivity does not apply for the reason that it would cause an endless amount of reopened returns. Where regulations or rulings are not retroactive it is so stated.

Since the sixteenth Constitutional Amendment (dated Feb. 25, 1913) which authorizes the laying and collecting of income taxes, the following regulations have been promulgated by the Bureau of Internal Revenue with the approval of the Secretary of the Treasury:

Regulations 33.	Issued Jan. 5, 1914.
Regulations 33. (Revised)	Approved Jan. 2, 1918 but not released until Feb. 2, 1918.
Regulations 41.	Released Feb. 4, 1918.
Regulations 45.	Issued Feb., 1919.
Regulations 45. (Revised)	Apr. 17, 1919.
Regulations 45. (1920 edition)	Promulgated Jan. 28, 1921; released Feb. 14, 1921.
Regulations 62. (1922 edition)	Promulgated Feb. 15, 1922; released Mar. 1, 1922.

Need for Inventory to Determine Income.—Before taking up for discussion the matter of inventory *valuation* from the tax standpoint, a subject to which the greater part of this chapter is devoted, it is best perhaps to comment briefly upon need of inventories in the determination of taxable income. The first statement to be published concerning this subject in connection with the income tax laws appeared in Regulations 33, Art. 161. This statement read:

Inventory of Materials and Merchandise.—In order that certain classes of corporations may arrive at their correct income, it is necessary that an inventory, or its equivalent, of materials, supplies, and merchandise on hand for use or sale at the close of each calendar year shall be made in order to determine the gross income or to determine the expense of operation.

A physical inventory is at all times preferred but where a physical inventory is impossible and an equivalent inventory is equally accurate, the latter will be acceptable.

An equivalent inventory is an inventory of materials, supplies, and merchandise on hand taken from the books of the corporation.

The following excerpts, taken from the regulations under the Revenue Act of Oct. 3, 1917, were the next rulings to be issued with regard to the need for inventories:

Art. 91.— . . . Instructions as to how inventories shall be taken will be included in special regulations to be furnished upon application to the Collector of Internal Revenue.

Art. 120.— . . . In all cases where inventories are taken (and they must be taken where the business consists of buying and selling commercial commodities) for the purpose of ascertaining the gain or loss resulting from the business of the year, the inventories must be taken in accordance with instructions to be included in special regulations which will be furnished upon application to the Collector of Internal Revenue.

Although the *regulations* under the income tax laws prior to the 1918 Law made mention of inventories in connection with the establishment of taxable income, the 1918 Law was the first income tax law that in the *law* itself specifically required inventories—if in the opinion of the Commissioner of Internal Revenue they were necessary to properly determine taxable income. The 1918 Law states:

Inventories.—Whenever in the opinion of the Commissioner the use of inventories is necessary in order clearly to determine the income of any taxpayer, inventories shall be taken by such taxpayer upon such basis as the Commissioner, with the approval of the Secretary, may prescribe as conforming as nearly as may be to the best accounting practice in the trade or business and as most clearly reflecting the income (*Law Sec.* 203).

This section relating to inventories, identical in wording and law section number, also appears in the 1921 law. While the wording is also the same for the 1924 law the law section under this law has been changed from 203 to 205. By reason of Treasury Decision 3296, date Mar. 3, 1922, Art. 1581 under Sec. 203 of Regulations 45 was amended so that it now is identical with Art. 1581 of Regulations 62 under the 1921 law. Thus like law sections are supported by like regulations. To quote the regulation with respect to the requirement of inventories:

Art. 1581. *Need of Inventories.*—In order to reflect the net income correctly, inventories at the beginning and end of each year are necessary in every case in which the production, purchase or sale of merchandise is an income-producing factor. The inventory should include raw materials and supplies on hand that have been acquired for sale, con-

sumption or use in productive processes, together with all finished or partly finished goods. Only merchandise title to which is vested in the taxpayer should be included in the inventory. Accordingly the seller should include in his inventory goods under contract for sale but not yet segregated and applied to the contract and goods out upon consignment, but should exclude from inventory goods sold, title to which has passed to the purchaser. A purchaser should include in inventory merchandise purchased, title to which has passed to him although such merchandise is in transit or for other reasons has not been reduced to physical possession, but should not include goods ordered for future delivery transfer of title to which has not yet been effected (*Regulations* 45—1920 *edition*), (*Regulations* 62—1922 *edition*).

The regulations under the respective laws of 1918 and 1921 make further reference to this subject when they state:

. . . In all cases in which the production, purchase, or sale of merchandise of any kind is an income-producing factor inventories of merchandise on hand (including finished goods, work-in-process, raw materials, and supplies) should be taken at the beginning and end of the year and used in counting the net income of the year (*Regulations* 45; *Sec.* 212; *Art.* 24), (*Regulations* 62; *Sec.* 212; *Art.* 24).

Valuation of Inventories.—Although up to October, 1916 it was the working rule of the Bureau of Internal Revenue that inventories should be taken at cost, no expression of this rule appeared in any regulations, Treasury Decisions, or upon any return forms. Regulations 33, to be sure, required the *use* of inventories but they did not lay down any rules as to the basis upon which inventories were to be *valued.*

In October, 1916 the first instruction regarding inventory valuations were set forth and appeared as instructions on the revised Form No. 1031. These instructions read:

In case the annual gain or loss is determined by inventory, merchandise must be inventoried at the cost price, as any loss in salable value will ultimately be reflected in the sales during the year when the goods are disposed of.

Thus the first instructions insisted upon the use of cost in pricing the inventory. In spite of the fact that these instructions in principle coincided with the working rule of the Bureau in force up to that time, it must be remembered that the working rule was not an inflexible one, nor was it applied without a certain

amount of elasticity. For instructions to be promulgated wherein merchandise "*must be inventoried at cost price*" was another thing. Needless to say this caused a great deal of adverse criticism, for not only was it manifestly unsatisfactory and unfair to many concerns but it was decidedly poor accounting both in theory and practice. It may be mentioned that in many instances these instructions were not adhered to by those taxpayers who wished to show statements of their correct earnings.

Adoption of "Cost or Market."—The instructions requiring the pricing of inventories at cost prices were in effect until Dec. 19, 1917, on which day Treasury Decision 2609 was issued. This decision laid down for the first time the rule that inventories might be valued upon the basis of (*a*) cost or (*b*) cost or market, whichever is lower.

> . . . Inventories of supplies, raw materials, work-in-process of production, and unsold merchandise must be taken either (*a*) at cost, or (*b*) at cost or market price, whichever is lower; provided that the method adopted must be adhered to in subsequent years unless another be authorized by the Commissioner of Internal Revenue (*T. D.* 2609; *Dec.* 19, 1917).

In January, 1918 Form No. 1031 was revised to conform to T. D. 2609. The instructions concerning inventories on this form read:

> If the corporation makes inventories of merchandise or materials, explain the basis on which they are made, whether (*a*) at cost, or (*b*) at cost or market value, whichever is lower.

Shortly after the approval of T. D., 2609 the legality of this regulating decision was questioned and the case placed before the Supreme Court of the United States. Before the case was decided another Treasury Decision (T. D. 2649) was issued. This decision, extracts of which follow, was made for the purpose of declaring in what way the taxpayer should be governed so far as tentative returns were concerned, until the pending case was decided.

> . . . T. D. 2609, issued under date of Dec. 19, 1917, authorizes dealers in merchandise and dealers in securities to make their income-tax and excess-profits tax returns upon the basis of inventories taken "at cost or at market price, whichever is lower."

The legality of this authorization having been questioned, the matter was referred to the Attorney-General, who advises that the general principle at issue is involved in cases pending in the Supreme Court of the United States and that an early decision may be reasonably expected. Pending this decision returns made upon the basis of T. D. 2609 will be tentatively accepted (*T. D.* 2649; *Jan.* 30, 1918).

On May 20, 1918 the Supreme Court of the United States decided affirmatively with respect to the legality of the regulations under Treasury Decision 2609. As a result Treasury Decision 2744 was approved and issued.

. . . As question had arisen as to the legality of the authorization by Treasury Decision No. 2609 of returns for income and excess-profits tax purposes upon the basis of inventories taken "at cost or market value, whichever is lower," the matter was referred to the Attorney-General. The Attorney-General has advised upon the basis of a recent decision of the Supreme Court (*Doyle v. Mitchell Brothers*, decided May 20, last) that the methods of taking inventories authorized by Treasury Decision No. 2609 are permissible (*T. D.* 2744; *July* 3, 1918).

Treasury Decision 2609 is, therefore, the first authoritative pronouncement upon the matter of inventory valuations and the rule laid down by it (cost, or cost or market, whichever is lower) is applicable to both the 1913 and 1916 Acts.

Meaning of "Cost or Market Basis."—It should be clearly understood that whenever the basis "cost or market, whichever is lower" is used such basis must be applied to *each* item of the inventory and not merely to the total of the inventory. This means that the unit cost price and the unit market price of each item of inventory must first be obtained and then compared one with the other. If the unit cost price is lower than the unit market price the former is used, and if the contrary is the case the latter price is used. The *lower* of the two prices is taken.

Valuation of Inventories under Regulations 45.—Regulations 45 were the first regulations to lay down definite instructions concerning the details of inventory valuation. While these instructions were a decided improvement over the previous situation they still left much to be desired. Since the date of their first promulgation there have been many new decisions and rulings, concerning the matter of inventory valuations which have necessitated, from time to time, amendments to the sundry articles of the regulations. Thus the original instructions under

Regulations 45 have undergone considerable change until now they have emerged vastly broader in scope, more definite in interpretation, and with more appreciative regard for the taxpayer.

Below are reprinted the instructions which appeared in the first publication of Regulations 45 under the Revenue Act of 1918. They are given here for two reasons: first, to allow comparisons to be made with the latest amended articles of Regulations 45 and second, for their specific instructions concerning inventories for the year 1918, matters which the most recently amended articles do not definitely mention. (*Regulations* 45; February 1919).

Art. 1582. *Valuation of Inventories.*—Inventories should be valued at (*a*) cost or (*b*) cost or market whichever is lower. Whichever basis is adopted must be applied to each item and not merely to the total of the inventory; this is, if for instance basis (*b*) is adopted, the value of each item in the inventory will be measured by market if that is lower than cost, or by cost if that is lower than market. A taxpayer may, regardless of his past practice, adopt the basis of cost or market, whichever is lower, for his 1918 inventory, provided a disclosure of the fact and that it represents a change is made in the return. Thereafter changes can be made only after permission is secured from the Commissioner. (But see article 1585 for inventories by dealers in securities.) Inventories should be recorded in a legible manner and properly computed and summarized, and should be preserved as a part of the accounting records of the taxpayer. Goods taken in the inventory which have been so intermingled that they cannot be identified with specific invoices will be deemed to be the goods most recently purchased.

Art. 1583. *Inventories at Cost.*—Cost means:

(1) In the case of merchandise purchased, the invoice price less trade or other discounts approximating a fair interest rate, which may be deducted or not at the option of the taxpayer provided a consistent course is followed. To this net invoice price should be added transportation or other necessary charges incurred in acquiring possession of the goods.

(2) In the case of merchandise produced by the taxpayer, (*a*) the cost of raw materials and supplies entering into or consumed in connection with the product, (*b*) expenditures for direct labor, (*c*) indirect expenses incident to and necessary for the production of the particular article, including in such indirect expenses a reasonable proportion of management expenses, but not including any cost of selling or return on capital whether by way of interest or profit. In any

industry in which the usual rules for computation of cost of production are inapplicable, costs may be approximated upon each basis as may be reasonable and in conformity with established trade practice in the particular industry.

Art. 1584. *Inventories at Market.*—Market means the current bid price prevailing at the date of the inventory for the particular merchandise, and is applicable to goods purchased and on hand and to basic materials in goods in process of manufacture and in finished goods on hand, exclusive, however, of goods on hand or in process of manufacture for delivery upon firm sales contracts at fixed prices entered into before the date of the inventory. Where no open market quotations are available the taxpayer must use such evidence of a fair market price at the date or dates nearest the inventory as may be available to him, such as specific transactions in reasonable volume entered into in good faith, or compensation paid for cancellation of contracts for purchase commitments. The burden of proof will rest upon the taxpayer in each case to satisfy the Commissioner of the correctness of the prices adopted. It is recognized that in the latter part of 1918, by reason among other things of governmental control not having been relinquished, conditions were abnormal and in many commodities there was no such scale of trading as to establish a free market. In such a case, when a market has been established during the succeeding year, a claim may be filed for any loss sustained in accordance with the provisions of section 214 (*a*) (12) or section 234 (*a*) (14) of the statute (see Arts. 261–268).

Important Rulings under Regulations 45.—It has previously been explained that new rulings with respect to the valuation of inventories are made from time to time by the Bureau of Internal Revenue. Some of these rulings are decisions in specific cases only; others are so generally applicable that they effect to amend the existing regulation. The former, usually understood to mean rulings other than Treasury Decisions, have not the force nor effect of Treasury Decisions, and they are held not to commit the Treasury Department as to an interpretation of the revenue law unless they have been formally approved by the Secretary of the Treasury. It must be remembered that such rulings are made upon facts which are peculiar to certain cases and that the same ruling may not apply to another case unless the facts of the second case are identical with the first. Those rulings which are applicable generally appear in the form of Treasury Decisions.

From the large number of rulings which have been promulgated by the Treasury Department, the more important ones pertaining to inventory valuations have been selected and reprinted below.

Reference to the class of ruling is given in each case by class abbreviations and numerals at the end of each ruling. The abbreviations used here are exactly the same as those which appear in the various government bulletins and in order that they may be made clearer for the reader, the full class name is given opposite each.

C. B.—Cumulative Bulletin.
T. D.—Treasury Decision.
O. D.—Office Decision.
S.—Solicitor's Memorandum.
O.—Solicitor's Law Opinion.
T. B. M.—Advisory Tax Board Memorandum.
I. T.—Income Tax Unit.
T. B. R.—Advisory Tax Board Recommendation.

Goods Acquired or Manufactured Prior to Mar. 1, 1913.—Solicitor's Memorandum 1003 relative to Sec. 202, Art. 1561 holds with regard to goods acquired or manufactured prior to Mar. 1, 1913:

Where a taxpayer takes inventories on the basis of cost or market price, whichever is lower, goods which were acquired before March 1, 1913, will be inventoried at the market price at the time of the inventory, whichever is lower (*S.* 1003: *C. B.* 1–245).

Estimated Inventories.—Under Regulations 45, Sec. 23, Office Decision 133 does not permit of estimated inventories. It states:

Ruling.—A taxpayer who for many years has elected to take inventory only every two years, and used an estimated inventory in the return for the intermediate year, making any necessary adjustments in the return for the following year when an actual inventory was taken, may not apportion his total earnings for the two years 1917 and 1918 equally between such years for income tax purposes (*C. B.* 1–211; *O. D.* 133).

Inventory Date of Each Division of a Concern Must Coincide.

Ruling.—After the year 1918 taxpayers will not be permitted to adopt one method for inventorying and closing their books applicable to one part of their business, and a different period applicable to another part thereof (*Regulations* 45; *Sec.* 212; *Art.* 23; *O. D.* 289; *C. B.* 1–541).

"Base-stock" Method of Valuation.—The question was raised under the Revenue Acts of 1917 and 1918 as to whether or not the "base-stock" method of taking inventories was permissible.

According to this method of taking inventories a manufacturer or dealer places the same value year after year upon a minimum quantity of materials or merchandise which it is claimed must be on hand at all times. The term "base-stock" is also known under the names of "minimum stock" and "cushion stock."

This question was settled in the ruling T. B. R. 65 made by the Advisory Tax Board. Among other things this ruling stated:

". . . that neither the base-stock method of taking inventories, nor the moving-average method, nor a method based upon the presumption that goods in the inventory are the earliest purchases, is in conformity with the Revenue Act of 1917 or of the Revenue Act of 1918, and recommends that no changes be made in the present regulations with respect to the method of taking inventories."

Inventories of Material Purchased for Government Contracts.

Ruling.—Procurement orders issued after Nov. 11, 1918, in confirmation or informal orders entered into prior to Nov. 12, 1918, are Government contracts made between Apr. 6, 1917 and Nov. 11, 1918, within the meaning of the Revenue Act of 1918 and whether fulfilled in 1918 or 1919 will be taxed at rates applicable to Government contracts.

In so far as stock purchased for Government contracts is used or useful for commercial purposes no separate inventory thereof need be made for Government contract accounting, such inventories being treated as commercial inventories in the ordinary course at the close of the taxable year 1919. If, however, a portion of such goods purchased is useful only for Government contracts and is still on hand at the close of the taxable year 1919, such goods should be inventoried at the then value if lower than cost and assigned to take Government contract section of the income statement for that year (*Regulations* 45; *Sec.* 1; *Art.* 1510; *O. D.* 394; *C. B.* 2–721).

These instructions, however, do not apply to materials on hand at the close of the taxable year 1919 which were a part of claims arising out of canceled war contracts. The cost of such material together with other items of claims should not set up as inventories but instead as accounts receivable directly from the government (in the case of prime contracts) or in the case of sub-contracts, receivable from the prime contractors.

The material mentioned in the ruling refers to material which eventually was incorporated in and became a part of the finished product, accepted and paid by the government in accordance with contract prices.

Average Market Prices over a Period of Years.

Ruling.—A company taking inventory upon the basis of the average of the market prices prevailing over a period of years does not conform to the method of computing inventories in accordance with articles 1581–1585, Regulations 45, and it should therefore be required to file amended returns (*Regulations* 45; *Sec.* 203; *Art.* 1582; *T. B. M.* 31; *C. B.* 1–269).

Average Cost Method of Valuing Inventories Not Permissible. Request has been made for advice as to whether the average cost method of taking inventories used by certain corporations is permissible under the act of Sept. 8, 1916, or under the act of Oct. 3, 1917. Briefly stated, the method in question is as follows:

Materials purchased during a month are added both as to quantity and cost, to the quantity and cost balance brought forward from the previous month, and an average cost to the close of the month is computed by dividing the total quantity into the total money figures. This average is then applied to the quantity of materials used for manufacture during the month, and the amount so computed is credited to the material account.

. . . The importance of the question in the particular instance now under review lies in the fact that materials purchased are not correctly consumed in manufacture, but are held for ageing purposes from say, one to three years.

. . . Under these circumstances does an inventory so computed form a proper factor for the computation of taxable income . . .

Ruling.—The valuation of inventories upon the basis of average cost is not in accord with the provision of the acts of Oct. 3, 1913, Sept. 8, 1916 (including this act as amended Oct. 3, 1917) and the revenue act of 1918, and where used amended returns may be required (*T. B. R.* 48).

An important exception to the above ruling has been made in the instance of companies engaged in the tobacco industry. As a result of an appeal made by several tobacco companies it has been held:

Ruling.— . . . That tobacco companies taking inventory on the monthly average cost method, no method more nearly approaching theoretical accuracy being practically possible, may continue to use such method in reporting for income tax (*A. R. R.* 18).

The peculiar conditions associated with the tobacco industry which demonstrated that theoretical accuracy is not practically possible are:

1. Method of purchasing in small lots of varying quantity and quality at widely fluctuating prices.

2. Necessity of regarding and sorting purchases according to quality, color, texture, weight, crop, length and breadth of leaf, etc.

3. Long period of time during which raw material must be held.

4. Fact that crops of different years and from different localities must be blended in varying proportions to get proper flavor and uniform product.

5. Fact that oldest purchases are not and cannot be used first because of necessity for blending.

6. Fact that product must be sold in containers, the size of which is regulated by statute at a uniform price.

The method followed, as understood by the Committee, is an average cost method and not an average cost or market method. Accordingly, if the market should be below the average cost at the close of a given year, the average cost shall be the basis of valuation and not the lower market price. Companies adopting average cost methods of inventorying for income tax purposes should be required to adhere to that method in future years (*A. R. R.* 18).

Valuations for 1920 Inventory.—In June, 1920 the first post-war deflation period commenced. Starting slowly, the deflation of commodity and security prices gained such momentum that by the end of the year prices had fallen to extremely low levels. In fact, in certain commodities there were no markets in spite of published market prices; materials were a drug on the market; there were no purchasers. The situation, to say the least, was exceedingly abnormal.

Up to the month when the deflation process started business had been very good and inventories had been piling up at a fast rate. Then the crash came, with many firms taking enormous losses in inventories.

In the matter of taxes the Treasury Department foresaw that extreme hardships would come to those concerns who, under the Regulations 45, had elected in 1919 to accept the *cost* basis for inventory valuation purposes. No doubt this timely recognition on the part of the Treasury Department was brought about by the many requests made by taxpayers for permission to change to the basis of "cost or market, whichever is lower." Whatever the subsidiary causes may have been Treasury Decision 3108 was issued as of Dec. 31, 1920. This decision gave the relief that was sought for in many instances, although many concerns, on the other hand, were required to price their inventories at cost. This for the reason that there were no market prices to use, in spite of the fact that the Treasury Department admitted

that market was lower than cost at the time. Among other things it stated:

> . . . A tax payer may, regardless of past practice, adopt the basis of "cost or market whichever is lower" for his 1920 inventory, provided a disclosure of the fact and that it represents a change are made in the return (*T. D.* 3108, *Dec.* 30, 1920).

Computing Approximate Cost Prices from Selling Market Prices.—The following law opinion was made by the Solicitor with respect to determining approximate cost prices from selling market prices, in the absence of conditions which permit of actual costs:

> The rule applicable to all industries is that inventories should be taken on the basis "(*a*) cost, or (*b*) cost or market, whichever is lower." It is recognized that in some industries the actual cost of production cannot be ascertained accurately, and it is therefore necessary to approximate a cost value by using selling market prices as a starting point and reducing such selling market prices in each case by an amount sufficient to eliminate the element of profit. This rule is applicable to the inventories of farmers and stockmen, and is widely used in many lines of industry, notably in those types of mining and manufacturing in which a product of more than one grade or more than one kind is obtained by a common operation. Under its application a result can be reached that fairly approximates the inventory basis laid down in the Regulations as stated above (*Regulations* 45; *Sec.* 212; *Art.* 23; *O.* 844; *C. B.* 1–268).

Merchandise Carried Over from Previous Inventory.—The Income Tax Unit has ruled the following with respect to the valuation of merchandise which has been carried over from a previous inventory:

> *Ruling.*—Cost for the purpose of valuing an inventory is to be determined in accordance with article 1583 of Regulations 62 regardless of whether the basis of cost, or cost or market, whichever is lower, is used. Therefore, where an inventory of goods at the close of a taxable year includes merchandise which was on hand at the beginning of the year, the cost thereof, to be compared with market in applying the basis of cost or market, whichever is lower, should be the price at which such goods were included in the opening inventory (*Regulations* 62; *Sec.* 203; *Art.* 1583; *I. T.* 1561).

Based on the above ruling an article of merchandise or material which has appeared in a former inventory and which now appears

in the current inventory must have cost (for the purposes of the current inventory) considered as the price used in the former inventory. Let it be assumed, for example, that a certain article was purchased on Nov. 22, 1922 for $250. On the basis of cost or market, whichever is lower, this article was taken in the 1922 inventory at the market price of $200. For purposes of the 1923 inventory, this same article remaining unsold, the cost must be considered not $250, but instead $200, and the present market price compared with the latter amount.

Present Regulations—Revenue Act of 1918.—The latest amendment to the inventory section (203) under Regulations 45 (1920 edition) are contained in T. D. 3296, approved Mar. 3, 1922. These amended articles (1581 to 1588) with the exception of Art. 1581, *Need of Inventories,* are reprinted below exactly as they now appear in the regulations under the Revenue Act of 1918. Article 1581 is omitted here, first because it is not concerned with inventory *valuation,* and second it has already been given.

REVENUE ACT OF 1918

Art. 1582. *Valuation of Inventories.*—The Act provides two tests to which each inventory must conform—(1) It must conform as nearly as may be to the best accounting practice in the trade or business, and (2) it must clearly reflect the income. It follows, therefore, that inventory rules can not be uniform but must give effect to trade customs which come within the scope of the best accounting practices in the particular trade or business. In order to clearly reflect income, the inventory practice of a taxpayer should be consistent from year to year, and greater weight is to be given to consistency than to any particular method of inventorying or basis of valuation, so long as the method or basis used is substantially in accord with these regulations. An inventory that can be used under the best accounting practice in a balance sheet showing the financial position of the taxpayer can, as a general rule, be regarded as clearly reflecting his income.

The basis of valuation most commonly used by business concerns and which meets the requirements of the Revenue Act is (*a*) cost or (*b*) cost or market, whichever is lower. (For inventories by dealers in securities, see Art. 1585.) Any goods in an inventory which are unsalable at normal prices or unusable in the normal way because of damage, imperfections, shop wear, changes of style, odd or broken lots, or other similar causes, including secondhand goods taken in exchange, should be valued at bona fide selling prices less cost of selling whether basis (*a*) or (*b*) is used, or if such goods consist of raw materials or partly

finished goods held for use or consumption, they should be valued upon a reasonable basis taking into consideration the usability and the condition of the goods, but in no case shall value be less than the scrap value. Bona fide selling price means actual offerings of goods during a period ending not later than 30 days after inventory date. The burden of proof

Form 1126
U. S. Internal Revenue

CERTIFICATE OF INVENTORY

(To be filed with Collector of Internal Revenue with Income Tax Return)

For Calendar Year 1923

Or for period begun — , 19—, *and ended* — , 19—

Name THE UNITED CORPORATION

Address 100 So. LA SALLE ST. CHICAGO, ILLINOIS

PRINCIPAL CERTIFICATE

Number of sheets submitted herewith 1

I swear (or affirm) that the closing inventory of the taxpayer named above, amounting to $ 1,501,627.03, was taken under my direction, and that to the best of my knowledge and belief is true and complete in every respect; that the method of pricing the raw material, work in process, and finished goods was at * COST OR MARKET WHICHEVER IS LOWER; that I have carefully read all of the instructions on the reverse side of this form; that this inventory was taken in accordance therewith; and that the following-named persons whose separate certificates are subscribed hereon or attached hereto are the officers and employees under whose personal direction the various parts of this inventory were taken:

Name.	*Title or position.*	*Part of inventory taken.*	*Amount.*
T. M. SCHALL	SUPERINTENDENT	WORK-IN-PROCESS	$ 371,624.90
E. O. NELSON	STOREKEEPER	RAW + FINISH. MAT'LS	$ 879,984.98
P. BROWN	BRANCH MANAGER	BRANCH INVENTORIES	$ 250,017.15
			$

Sworn to and subscribed before me this 15 day of JANUARY, 1924

L. P. Lawton (Signature.)

R. E. James Notary Public (Signature of officer administering oath.) (Title.)

VICE PRESIDENT (Title.)

* State "cost" or "cost or market, whichever is lower." If any other basis was used, describe fully, state why used and date on which inventory was last reconciled with stock.

SUBSIDIARY CERTIFICATE

I (or we), the undersigned employees of the taxpayer named above swear (or affirm) that I (or we) personally directed and observed the taking of the parts of the inventory set opposite my (or our) names, and, to the best of my (or our) knowledge and belief, is true and complete in every respect; that I (or we) have carefully read the instructions on the reverse side of this form and that the parts of the inventory for which I am (or we are) responsible was taken in accordance therewith.

Signature.	*Title or position.*	*Part of inventory taken.*
T. M. Schall	SUPERINTENDENT	WORK-IN-PROCESS.
E. O. Nelson	STOREKEEPER	RAW + FINISHED MATERIALS
P. Brown	BRANCH MANAGER	BRANCH INVENTORIES

Sworn to and subscribed before me this 15 day of JANUARY, 1924

R. E. James Notary Public (Signature of officer administering oath.) (Title.)

will rest upon the taxpayer to show that such exceptional goods as are valued upon such selling basis come within the classifications indicated above and he shall maintain such records of the disposition of the goods as will enable a verification of the inventory to be made.

In respect to normal goods, whichever basis (*a*) or (*b*) is adopted must be applied with reasonable consistency to the entire inventory. Tax-

payers were given an option to adopt the basis of either (*a*) cost or (*b*) cost or market, whichever is lower for their 1920 inventories, and the basis adopted for that year is controlling and a change can now be made only after permission is secured from the Commissioner. Goods taken in the inventory which have been so intermingled that they can not be identified with specific invoices will be deemed to be either (*a*) the goods most recently purchased or produced, and the cost thereof will be the actual cost of the goods purchased or produced during the period in which the quantity of goods in the inventory has been acquired, or (*b*) where the taxpayer maintains book inventories in accordance with a sound accounting system in which the respective inventory accounts are charged with the actual cost of the goods purchased or produced and credited with the value of goods used, transferred or sold, calculated upon the basis of the actual cost of the goods acquired during the taxable year (including the inventory at the beginning of the year), the net value as shown by such inventory accounts will be deemed to be the cost of the goods on hand. The balances shown by such book inventories should be verified by physical inventories at reasonable intervals and adjusted to conform therewith.

Inventories should be recorded in a legible manner, properly computed and summarized, and should be preserved as a part of the accounting record of the taxpayer. The inventories of taxpayers on whatever basis taken will be subject to investigation by the Commissioner, and the taxpayer must satisfy the Commissioner of the correctness of the prices adopted.

The following methods, among others, are sometimes used in taking or valuing inventories, but are not in accord with these regulations, viz.:

(*a*) Deducting from the inventory a reserve for price changes, or an estimated depreciation in the value thereof.

(*b*) Taking work-in-process, or other parts of the inventory, at a nominal price or at less than its proper value.

(*c*) Omitting portions of the stock on hand.

(*d*) Using a constant price or nominal value for a so-called normal quantity of materials or goods in stock.

(*e*) Including stock in transit, either shipped to or from the taxpayer, the title of which is not vested in the taxpayer.

Art. 1583. *Inventories at Cost.*—Cost means:

(1) In the case of merchandise on hand at the beginning of the taxable year, the inventory price of such goods.

(2) In the case of merchandise purchased since the beginning of the taxable year, the invoice price less trade or other discounts, except strictly cash discounts, approximating a fair interest rate, which may be deducted or not at the option of the taxpayer, provided a consistent course is followed. To this net invoice price should be added trans-

portation or other necessary charges incurred in acquiring possession of the goods.

(3) In the case of merchandise produced by the taxpayer since the beginning of the taxable year (*a*) the cost of raw materials and supplies entering into or consumed in connection with the product, (*b*) expenditures for direct labor, (*c*) indirect expenses incident to and necessary for the production of the particular article, including in such indirect expenses a reasonable proportion of management expenses, but not including any cost of selling or return on capital whether by way of interest or profit.

(4) In any industry in which the usual rules for computation of cost or production are inapplicable, costs may be approximated upon such basis as may be reasonable and in conformity with established trade practice in the particular industry. Among such cases are (*a*) farmers and raisers of live stock (see Art. 1586), (*b*) miners and manufacturers who by a single process or uniform series of processes derive a product of two or more kinds, size or grade, the unit cost of which is substantially alike (see Art. 1587), and retail merchants who use what is known as the "retail method" in ascertaining approximate cost (see Art. 1588).

Art. 1584. *Inventories at Market.*—Under ordinary circumstances, and for normal goods in an inventory, "market" means the current bid price prevailing at the date of the inventory for the particular merchandise in the volume in which usually purchased by the taxpayer, and is applicable in cases (*a*) of goods purchased and on hand, and (*b*) of basic elements of cost (materials, labor and burden) in goods in process of manufacture and in finished goods on hand; exclusive, however, of goods on hand or in process of manufacture for delivery upon firm sales contracts (*i.e.*, those not legally subject to cancellation by either party) at fixed prices entered into before the date of the inventory which goods must be inventoried at cost. Where no open market exists or where quotations are normal due to stagnant market conditions, the taxpayer must use such evidence of a fair market price at the date or dates nearest the inventory as may be available, such as specific purchases or sales by the taxpayer or others in reasonable volume and made in good faith, or compensation paid for cancellation of contracts for purchase commitments. Where the taxpayer in the regular course of business has offered for sale such merchandise at prices lower than the current price as above defined, the inventory may be valued at such prices less proper allowance for selling expense, and the correctness of such prices will be determined by reference to the actual sales of the taxpayer for a reasonable period before and after the date of the inventory. Prices which vary materially from the actual prices so ascertained will not be accepted as reflecting the market. It is recognized that in the latter part of 1918, by reason among other things of govern-

mental control not having been relinquished, conditions were abnormal and in many commodities there was no such scale of trading as to establish a free market. In such a case, when a market was established during the succeeding year, a claim may be filed for any loss sustained in accordance with the provisions of section 214 (*a*) 12 or section 234 (*a*) 14 of the statute (see Arts. 261–268).

Art. 1585. *Inventories by Dealers in Securities.*—A dealer in securities who in his books of account regularly inventories unsold securities on hand either (*a*) at cost or (*b*) at cost or market, whichever is lower, or (*c*) at market value, may make his return upon the basis upon which his accounts are kept; provided that a description of the method employed shall be included in or attached to the return, that all the securities must be inventoried by the same method and that such method must be adhered to in subsequent years, unless another be authorized by the Commissioner. For the purpose of this rule a dealer in securities is a merchant of securities, whether an individual, partnership, or corporation, with an established place of business, regularly engaged in the purchase of securities and their resale to customers; that is, one who as a merchant buys securities and sells them to customers with a view to the gains and profits that may be derived therefrom. If such business is simply a branch of the activities carried on by such person, the securities inventories as here provided may include only those held for purpose of resale and not for investment. Taxpayers who buy and sell or hold securities for investment or speculation, and not in the course of an established business, and officers or corporations and members of partnerships, who in their individual capacities buy and sell securities, are not dealers in securities within the meaning of this rule. A dealer in securities is not entitled to the benefits of section 206 with reference to the gain from the sale of securities.

Art. 1586. *Inventories of Live-stock Raisers and Other Farmers.*—(1) Farmers may change the basis of their returns from that of receipts and disbursements to that of an inventory basis, which necessitates the use of opening and closing inventories for the year in which the change was made. There should be included in the opening inventory all farm products (including live stock) purchased or raised which were on hand at the date of the inventory, but inventories must not include real estate, buildings, permanent improvements, or any other assets subject to depreciation.

(2) Because of the difficulty of ascertaining actual cost of live stock and other farm products, farmers who render their returns upon an inventory basis may at their option value their inventories for the current taxable year according to the "farm-price method" which provides for the valuation of inventories at market price less cost of marketing. If the use of the "farm-price method" of valuing inventories for any taxable year involves a change in method of pricing inventories from

that employed in prior years, the opening inventory for the taxable year in which the change is made should be brought in at the same value as the closing inventory for the preceding taxable year. If such valuation of the opening inventory for the taxable year in which change is made results in an abnormally large income for that year, there may be submitted with the return for such taxable year an adjustment statement for the preceding year based on the "farm-price method" of valuing inventories; upon the amount of which adjustments the tax, if any be due, shall be assessed and paid at the rate of tax in effect for such preceding year.

(3) Where returns have been made in which the taxable net income has been computed upon incomplete inventories, the abnormality should be corrected by submitting with the return for the current taxable year a statement for the preceding year in which such adjustments shall be made as are necessary to bring the closing inventory for the preceding year into agreement with the opening complete inventory for the current taxable year. If necessary to reflect the income similar adjustments may be made as at the beginning of the preceding year and the tax, if any be due, shall be assessed at the rate of tax in effect for such year.

Art. 1587. *Inventories of Miners and Manufacturers.*—A taxpayer engaged in mining or manufacturing who by a single process or uniform series of processes derives a product of two or more kinds, sizes or grades, the unit cost of which is substantially alike, and who in conformity to a recognized trade practice allocated an amount of cost to each kind, size or grade of product which in the aggregate will absorb the total cost of production, may use such allocated cost as a basis for pricing inventories, provided such allocation bears a reasonable relation to the respective selling values of the different kinds of product.

Art. 1588. *Inventories of Retail Merchants.*—Retail merchants who employ what is known as the "retail method" of pricing inventories may make their returns upon that basis, provided that the use of such method is designated upon the return, that accurate accounts are kept, and that such method is consistently adhered to unless a change is authorized by the Commissioner. Under this method the goods in the inventory are ordinarily priced at the selling prices and the total retail value of the goods in each department or of each class of goods is reduced to approximate cost by deducting the percentage which represents the difference between the retail selling value and the purchase price. This percentage is determined by departments of a store or by classes of goods, and should represent as accurately as may be the amounts added to the cost prices of the goods to cover selling and other expenses of doing business and for the margin of profit. In computing the percentage above mentioned, proper adjustment should be made for all mark ups and mark downs.

A taxpayer maintaining more than one department in his store or dealing in classes of goods carrying different percentages of gross profit should not use a percentage and profit based upon an average of his entire business but should compute and use in valuing his inventory the proper percentages for the respective departments or classes of goods.

Present Regulations—Revenue Act of 1921.—In Regulations 62 (1922 edition) Arts. 1581–1588, concerning inventories, are identical in every respect with articles of the same respective numbers which appear in Regulations 45 (1920 edition), as amended by T. D. 3296. Accordingly Arts. 1582 to 1588 reprinted above may be used as also applying to the regulations under the Revenue Act of 1921. In all probability the regulations under the Revenue Act of 1924 will have few, if any, new procedures with respect to the matter of inventories.[1]

Loss in Inventory—1918 and 1919.—On Nov. 11, 1918, the signing date of the armistice, the greater portion of this country's business was engaged directly or indirectly on work connected with the prosecution of the war. Because of the great preponderance of work of this nature the requirements of the government practically established and maintained all markets. Thus it naturally followed that upon the removal or modification of these demands, an abnormally large market for materials and services was thereby removed and prices subsequently fell to low levels.

Little time elapsed following the signing of the armistice before the Federal government commenced the work of either canceling or modifying all formal and informal contracts in effect at the time. Prime contractors upon receipt of governmental instructions to either stop or taper off production, in turn instructed their subcontractors. Thus resulted throughout the country a condition where practically every manufacturer and the greater majority of business concerns found themselves carrying "frozen" inventories abnormal both in quantity and cost.

On a rising market the maintenance of a proper quantity inventory requires the reinvestment of a portion of profits in the replacement inventory. At least it is safe to say that this statement holds true in the majority of cases. On this basis then a good portion of the profits for 1918, up to November were, for most concerns, reflected in both an abnormal quantity inventory and a higher priced replacement inventory.

[1] Regulations under the Revenue Act of 1924 have not been released at the date of this writing, November, 1924.

To permit a true statement of earnings for 1918, in view of the conditions which existed on the date of armistice and shortly thereafter, would have required the disposal of the abnormal quantity portion of the inventory being carried, and at the same time, the adjustment of the cost of the normal quantity portion to the opening inventory value. Unfortunately this could not and was not done in the short spaces of time between the dates of contract modification or cancellations and the end of the calendar year 1918, periods of time ranging from 45 days to 1 day.

It is a fact that in most cases prices did not decline during the 45-day period preceding the end of the year 1918 to the extent that they declined after that period. In many instances the price declines were little if any during the latter part of 1918. This condition effected to bring about the result whereby the pricing of inventories at cost or market whichever is lower, established profits, presumably earned, but "frozen up" in inventories, the balance sheet valuation of which for Dec. 3, 1918 was never realized in subsequent liquidation.

One matter deserves special comment at this point. Material, labor and overhead properly chargeable to the inventory account, which was applicable to cancelled portions of government contracts and subcontracts should have been priced at *cost*, taken out of the inventory, and set up as accounts receivable against the government or prime contractors.

The condition prevailing at the close of the year 1918, as far as inventories and their valuations were concerned, were to say the least, abnormal, and without relief many taxpayers would have been severely and unfairly penalized in the matter of tax levies. For the purpose of giving such relief as the situation seems to demand, although the adequacy of such relief as granted is open to question in several respects, law section 214 (*a*) was incorporated in the Revenue Act of 1918. This law section and its supporting regulations follow:

DEDUCTIONS ALLOWED: LOSS IN INVENTORY

Sec. 214.—(*a*) That in computing net income there shall be allowed as deduction:

(12) (*a*) At the time of filing return for the taxable year 1918 a taxpayer may file a claim in abatement based on the fact that he has sustained a substantial loss (whether or not actually realized by sale or other disposition) resulting from any material reduction (not due to

temporary fluctuation) of the value of the inventory for such taxable year, or from the actual payment after the close of such taxable year of rebates in pursuance of contracts entered into during such year upon sales made during such year. In such case payment of the amount of the tax covered by such claim shall not be required until the claim is decided, but the taxpayer shall accompany his claim with a bond in double the amount of the tax covered by the claim, with sureties satisfactory to the Commissioner, conditioned for the payment of any part of such tax found to be due, with interest. If any part of such claim is disallowed then the remainder of the tax due shall on notice and demand by the collector be paid by the taxpayer with interest at the rate of 1 per centum per month from the time the tax would have been due had no such claim been filed. If it is shown to the satisfaction of the Commissioner that such substantial loss has been sustained, then in computing the tax imposed by this title the amount of such loss shall be deducted from the net income. (*b*) If no such claim is filed, but it is shown to the satisfaction of the Commissioner that during the taxable year 1919 the taxpayer has sustained a substantial loss of the character above described then the amount of such loss shall be deducted from the net income for the taxable year 1918 and the tax imposed by this title for such year shall be redetermined accordingly. Any amount found to be due to the taxpayer upon the basis of such redetermination shall be credited or refunded to the taxpayer in accordance with the provisions of section 252.

Art. 261. *Losses in Inventory and from Rebates.*—Taxpayers are allowed deductions from net income for the taxable year 1918 for losses resulting (*a*) from material reductions after the close of the taxable year 1918 of the values of inventories for such taxable year, and (*b*) from actual payments after the close of the taxable year 1918 of rebates in pursuance of contracts entered into during such year upon sales made during such year. The taxable year of the taxpayer, whether calendar or fiscal, is meant in every case. Such deductions may be secured by two methods, either by a claim in abatement or by a claim for refund, and must not be entered upon the regular return.

Art. 262. *Loss from Rebates.*—Where after the close of the taxable year 1918 rebates have been bona fide paid in pursuance of contracts entered into during such year upon sales made during such year, the net income for that year may be reduced by the reduction of the amount of such rebates actually paid. No such deduction will be allowed unless the profits from such sales have been included in the income for the taxable year 1918.

Art. 263. *Loss in Inventory.*—Inventory losses are allowable either (*a*) where goods included in an inventory at the end of the taxable year 1918 have been sold at a low during the succeeding taxable year, or (*b*) where such goods remain unsold throughout the taxable year 1919 and

at its close have a then market value (not resulting from a temporary fluctuation) materially below the value at which they were inventoried at the end of the taxable year 1918. No deduction is allowable for losses of anticipated profits or for losses not substantial in amount, nor for physical damage or obsolescence occurring in the taxable year 1919. In determining whether goods included in an inventory at the end of the taxable year 1918 have been sold during the succeeding taxable year, and whether loss has resulted therefrom, sales of goods made in the taxable year 1919 will be deemed to have been made from the inventories stock of 1918 until such inventories stock is exhausted.

Art. 264. *Loss Where Goods Have Been Sold.*—Where goods included in the inventory at the end of the taxable year 1918 have been sold during the succeeding taxable year, the loss which may be deducted from net income for the taxable year 1918 is the amount by which the value at which the goods sold were included in the inventory exceeds the actual selling price minus a reasonable allowance for selling expenses and for manufacturing expenses, if any, incurred in the taxable year 1919 and attributable to such goods.

Art. 265. *Loss Where Goods Have Not Been Sold.*—Where goods included in the inventory at the end of the taxable year 1918 have not been sold during the succeeding taxable year, the loss which may be deducted from net income for the taxable year 1918 is the amount by which the net income for such year would be reduced if the inventory were redetermined and such goods taken at their market value (ignoring mere temporary fluctuations of value) at the end of the taxable year 1919.

Art. 266. *Claims.*—Claims in abatement should be filed with the collector on form 47 when the return for the taxable year 1918 is made. Claims for refund should be filed on form 46 not later than 30 days after the close of the taxable year 1919. Each claim shall contain a concise statement of the amount of the loss sustained and the basis upon which it has been computed, together with all pertinent facts necessary to enable the Commissioner to determine the allowability of the claim. The amount allowed by the Commissioner in respect of any such claim shall be deducted from the net income for the taxable year 1918 and the taxes shall be recomputed accordingly. Any excess paid over the tax due shall be credited or refunded to the taxpayer. See section 252 of the statute and articles 1031–1038. In computing income for the taxable year 1919 the opening inventory must be properly adjusted by the taxpayer in respect of any claim allowed for the year 1918 under this article.

CHAPTER XV

AUDITING AND RECONCILING THE INVENTORY

Auditing the Inventory.—A thorough audit of the physical inventory is a difficult task. So many conditions exist with respect to materials that only by the greatest care and analysis may one satisfy himself that the final inventory figures represent a fair and reasonable valuation. Not only is it necessary to perform the operations of verifying the accuracy of unit prices, totals, extensions, footings, and summaries, but in addition it is equally important that careful consideration be given to the accuracy of descriptions, quantities, status, and classifications of the material. Each operation is of course necessary, but *all* are necessary if the inventory is to be completely reviewed.

Because of the number of operations necessarily performed before the final inventory figure is determined, because of the number of employees engaged on each operation—the counting, inspecting, tag writing, checking coding, pricing, extending, totaling, and summarizing, because of the lack of uniformity only possible even under the most rigidily controlled methods, because of the temporary and unwelcome nature of inventory work, because of the lack of responsibility on the part of employees—because of these and many others, so many variable conditions exist, that an audit of a physical inventory must be a detailed one to bring about results approximating real facts.

The following inventory audit procedures, while not exhaustive, are comprehensive enough to illustrate methods which may be used to advantage for the purpose of establishing the correctness of inventory data and valuation.

1. Secure a copy of the inventory manual or any inventory instructions used, and acquaint yourself with the methods used in stock taking, pricing, and tabulating.

2. Confer with the one who has had charge of the inventory and request him to review the inventory work. If the one in charge of the inventory had several assistants in charge of respective divisions of the inventory organization, such as counters, inspectors, pricers, etc., request them also to comment on their

work. Seek information especially with respect to obsolete, salvage, work-in-process, and non-current materials or products.

3. Obtain the original detail tabulated or typewritten inventory sheets and the summaries.

4. Obtain a statement signed by the proper official showing the number of inventory tags used on the inventory.

5. Obtain all inventory tags, cards, or other forms upon which the original count was written and the material described, and arrange by tag numbers to determine what tags are missing.

6. Check the results of arranging the tags in numerical order with the statement of the number of tags used. List the tag numbers of all tags found to be missing and request that these tags be located.

7. Account for all tags used on inventory.

8. Resort all tags and arrange in the order as shown on original tabulated inventory sheets.

9. Check all inventory tag numbers against the inventory sheets.

10. Note all unchecked items on the sheets and determine if excess of items on sheets over tags is due to material in transit or on consignment, reported for inventory purposes by correspondence and statements and not by means of inventory tags. Obtain and verify all such correspondence and statements and note that they have been approved by the proper official.

11. Determine if any tags have been omitted from the tabulated inventory sheets.

12. Determine if all material to be inventoried by other means than inventory tags is included. Ascertain all outside locations of materials and obtain inventory documents pertaining to this material. Verify signatures of persons responsible therefor. This refers especially to materials shipped to outside firms for special work, material at distributing points, and materials at fairs, exhibitions, and permanent shows.

13. If tags reporting material or parts of the same kind, same part number, and same classification are not grouped together on the inventory sheets, determine the reason. Many times such items are intentionally scattered throughout the inventory sheets in order that different prices may be used for the same part or kind of material.

14. Verify unit total cost on each inventory tag.

15. Check extensions on tags.

16. Check accuracy of footings of inventory sheets.

17. Check accuracy of sheet or classification totals on inventory summary.

18. Determine if all data on inventory tags have been correctly transcribed to the inventory sheets.

19. Determine if inventory tags bear the names, initials, or numbers of those who wrote, priced, extended, checked, and tabulated the tags.

20. Check sales invoices at the end of the period under audit with shipping records to determine if any material sold and billed, but not shipped at the time of inventory, is included in the inventory.

21. Determine if any equipment, comprising capital charges, such as jigs, fixtures, factory equipment or machinery, has been erroneously included. Questionable items should be checked with such classifications of assets as are available. In these cases ascertain how the accounting department handles such items in their voucher distribution. If their method is correct, eliminate the item or allow it to stand, depending upon its correct classification.

Tag stubs usually remain attached to material for some time after the inventory. This is especially true with respect to materials in storerooms. Therefore even though the audit may be made a month or two after the inventory date it is possible to make a tour of the plant and inspect those tag stubs attached to manufacturing equipment, old material, second hand parts, used tools etc., all of which should not be a part of the inventory. A record should be made of the tag numbers (each stub should always have its serial number) appearing on stubs attached to this kind of material, the inventory tags later located in the office, and these items eliminated from the final tabulations.

22. Eliminate materials purchased for the construction of capital assets.

23. Determine if all material was counted, weighed, or measured, or if the quantities of some materials were estimated, and, where the value is great, make further verification by working back to the quantity shown in the inventory by considering all issues and receipts since the date of the inventory in conjunction with the count as of the date of verification. If a count is not practical, either obtain a new estimate or check with the bin tags.

24. Determine if all material in the inventory is owned by the company. Obtain a list of all material consigned inward for

sale, and product returned for repair by owners, and determine from account sales and credit memos, respectively, material on hand on the date of the inventory.

25. Test the reasonableness of the quantities of raw materials by comparison of such quantities with maximum limits, as shown on stores records, and with recent purchases.

26. Compare unusually large quantities of raw direct materials with the production schedule and the bill of material requirements, in order to determine possible excessive quantities reported.

27. Determine if all goods in warehouses have been inspected upon receipt for storage, and ascertain if they are good, usable, and salable.

28. Verify all warehouse receipts for goods in storage. Check material reported in warehouses with lists furnished by warehouses. Obtain such lists from the warehouses, if not on hand at the client's office.

29. Test reasonableness of quantities of work-in-process by checking with production records to determine the lot sizes usually scheduled through the shop. Test tag quantities with quantities shown on production records of work-in-process. Make allowance for spoilage and rejections. Should the inventory of work-in-process be taken from the cost record instead of from a physical inventory count, determine if any orders shown on the cost books as in-process have actually been completed and shipped, by checking the sales during the latter part of the fiscal period with the record of work-in-process and comparing order numbers.

30. Exclude from work-in-process inventory all construction work, of a capital nature, in process at the time of the inventory.

31. Investigate the amount of obsolete direct materials. Direct material may be obsolete for current models or products but may be used for spare or repair parts on old models or products still in use by customers. Establish obsolete material as follows:

a. Compare quantities in the present inventory with quantities shown in the inventories of past years.

b. Examine stock cards, ledgers, and records for inactive materials.

c. Examine all data concerning changes in specifications or design and discontinued models, products, or parts. Using this infor-

mation in conjunction with dates of changes and bills of materials, determine the amount of obsolete material, considering the number of obsolete models or products in service, and past experience in connection with demand for replacements of parts, breakage, etc.

d. Examine the last purchase order, noting the date and quantity. Refer to the purchase requisition and ascertain the specific purpose for which the material was purchased.

32. Investigate possibilities of adapting, to current models and products, materials applicable to obsolete models or products.

33. In many cases the planning, production, manufacturing, and cost departments have records of all obsolete parts or materials. Obtain these records and check against the inventory. If there are stores or stock ledgers for inactive materials or goods, examine these.

34. Check reasonableness of quantities of indirect materials by:

a. Comparison of quantity with maximum limit shown on ledgers in which the records of these supplies are carried.

b. Examination of stores ledgers and bin tags.

c. Examination of last purchase order.

d. Consideration of kind and size of business.

e. Recounting and working back to date of inventory.

35. Determine how much obsolete indirect material is included in the inventory. By reason of changes in production methods or discontinuance of the manufacture of certain models or products, indirect materials, especially operating supplies and consumable tools, are rendered obsolete. An inspection of the stores records or the bin tags for withdrawals over a certain period may readily indicate this condition. This test should be made on items showing large quantities.

36. If indirect material quantities appear excessive, determine from the stock records the quantities withdrawn on requisition over a given period, and ascertain if the present stock may deteriorate or become obsolete before it can be economically consumed. If so, consideration should be given to this matter in pricing such material.

37. In connection with consigned goods (outward), determine from account sales the amount of accounts receivable and the amount of inventory unsold.

38. Determine if the inventory tags contain sufficient description for proper pricing.

39. Ascertain the basis for pricing—whether cost, market, reproduction cost, replacement cost, selling cost, or any other basis that might be used. Determine how prices were obtained.

40. If the same parts or materials are used on several models or products and arranged under those respective models or products in the inventory sheets, satisfy yourself that the prices agree.

41. Determine what parts or components are both manufactured by the company and also purchased from outside sources. Verify the pricing of these parts or components to see if any unit price is erroneously used.

42. In verifying prices, eliminate any profit on materials received from other plants of the company, or from subsidiary companies whose accounts are joined with the parent company in the consolidated statement.

43. If the work-in-process, for inventory purpose, is priced on the basis of an estimated percentage of completion, determine that such estimate is reasonably accurate. Percentages from a cost standpoint and from a production standpoint in many instances vary greatly.

44. Determine if freight charges, duty, insurance, or any other direct charges are included in establishing the prices used in the inventory.

45. Investigate the overhead rate used in pricing. Determine if the overhead figure includes any of the following charges:

a. Administrative expenses.
b. Selling expenses.
c. Interest.
d. Abnormal factory overhead due to idle capacity.
e. Cost of excessive or abnormal spoilage.

46. Determine the basis and method of pricing:

a. Rough materials.
b. Raw castings, forgings, and stampings.
c. Work-in-process.
d. Finished parts, assemblies, products.
e. Obsolete direct materials.
f. Obsolete indirect materials.
g. Salvage.
h. Scrap.
i. Packing and shipping supplies.
j. Operating supplies.
k. Maintenance supplies.
l. Consumable tools.

47. Verify the pricing of raw or rough materials and standard purchased parts by comparison with invoices dated just prior to the inventory date, trade journals, and quotation sheets. Give

consideration to extra charges for special dimensions, gages, multiples, etc., and for charge-off of tool costs.

48. Check the accuracy of the pricing of parts-in-process by comparison with the cost records. Establish that the labor and overhead used in the unit price is only that labor and overhead up to, and including, the last operation performed on the material. See if any operations have been skipped, *i.e.*, if the sequence of operations has been broken. Determine if the labor cost is properly established by a cumulative summary of operation costs.

49. In the case of assemblies-in-process, determine if the prices were obtained from assembly cost sheets or estimated on the basis of the percentage of completion. Determine if the assembly cost sheets are correct and check with prices on the inventory tags. Use the same assembly cost sheets for checking finished assemblies.

50. In checking the prices of indirect materials, operating and maintenance supplies, and consumable tools, determine if the material has been described sufficiently to allow of correct pricing. It is common to find many tags bearing so little information that the prices must have been estimated. Obtain standard price lists from the purchasing department, together with the trade discounts of standard materials in effect about the time of the inventory, and compare the net figures with the inventory prices.

51. Determine the basis for pricing salvage material. Make sure that the pricing is no higher than the cost of a usable part less the amount required to make the salvage material usable.

52. Check the reasonableness of the overhead rate used in establishing the unit cost of work-in-process, finished parts, assemblies, and finished product, by analyzing the charges to overhead and the method of distribution. Make sure that the factory overhead cost is distributed over the various departments, shops, and commodities on a fair and equitable basis.

53. Determine if any profit is included in the price of finished product or other stock in trade. In this connection examine the selling price lists to see if cost prices for finished product on hand are below the selling prices less allowance for trade discounts.

54. Where unit prices are under one cent, determine if arbitrary prices are used or if the correct prices are rounded off. If the quantity is large and the unit price adjusted or rounded off, the difference may be a material one.

55. Investigate the pricing of product on consignment at dealers, distributors, and other agents, and at exhibitions, fairs, and permanent shows. Determine if allowance has been made for depreciation of product used as samples or demonstrators.

56. Determine if freight, handling charges, insurance, and any other direct charges have been added to the cost of goods consigned outward.

57. Eliminate from the inventory all partially consumed indirect materials, especially consumable tools. In all probability these have been requisitioned from stores and inventoried in error. Note the locations shown on the tags to see if all tools reported were counted in the storerooms.

58. Check the total inventory figure by the gross profit test. First, determine the percentage of gross profit shown during the past few years. Apply what is considered a representative percentage to the sales in order to establish the cost of goods sold. Commencing with the previous inventory, add purchases, subtract the cost of goods sold as calculated above, and the result should represent approximately the present inventory value. This is a dependable test only if the percentage of gross profit remains fairly constant. Consideration, however, must be given to the adjustment of the cost of production and the selling prices.

59. Determine if the amount of insurance carried on inventories is adequate. See if the insured is carrying insurance to the amount of 80 per cent of the value of inventories.

60. Determine if the amount of insurance is increased or decreased from time to time to accord with the increase or decrease in the investment in inventories.

61. Determine if any of the inventory is pledged to secure bank loans. Inspect insurance policies for indications of liens.

62. Reconcile the book inventory with the physical inventory, taking into consideration the items shown under "Reconciling the Physical Inventory with the Book Inventory."

63. When shipments are made to branch offices at selling prices be sure to determine:

a. That unsold goods on hand on the date of the balance sheet are taken into the inventory and not included among accounts receivable.

b. That selling prices are not used in valuing the branch office inventories.

64. Compare the inventory figures with certificates of inventory filed by the client with the Bureau of Internal Revenue.

65. Secure a statement signed by the proper officials certifying to the inventory, each official certifying to that part of the inventory over which he has had supervision, or for which he was responsible.

66. Prepare summary schedules of the following sections of the inventory:

a. Raw materials.
b. Work-in-process.
c. Finished parts.
d. Finished products.
e. Material in transit—inward.
f. Material in transit—outward.
g. Material on consignment (out).
h. Material on consignment (in).
i. Operating and maintenance supplies.
j. Consumable tools.
k. Repair machine parts.
l. Packing and shipping supplies.
m. Inventories in Foreign Countries.

67. When the inventory is a perpetual or book inventory, and not a physical inventory, the following operations of audit, in addition to many of those mentioned above, should be performed:

a. Verify the quantity additions of each material or stock sheet.
b. Check the quantity balance stated to be on hand.
c. Determine if all receipts have been posted.
d. Determine if all issues have been posted.
e. Determine if all adjustments have been posted.
f. Verify by tests the correctness of the postings.
g. Order in a reasonable and representative number of bin tags and check the quantities thereon with material ledger accounts.
h. Secure the date of the last physical check count of each item tested, and, if considerable time has elapsed since those dates request an up-to-date physical count.
i. Note all instances where material has not moved in or out of stores since the last inventory and question these materials concerning their value for current use.
j. Verify the accuracy of all prices, giving special consideration to unit prices computed on the basis of the weighted averages of a number of invoices.
k. Verify the extensions.
l. Use such of the operations of auditing the physical inventory shown in this section as are deemed necessary.

AUDIT OF RETAIL INVENTORY

1. Determine on what basis the valuation of the inventory has been established, *i.e.*, cost, cost-or-market, or by the "retail method." Cost figures may be verified with the cost books, stock records, or invoices. When the cost-or-market basis has been used, prices should be scrutinized carefully for arbitrary and unsupported market prices. Market prices of many items of merchandise are very difficult to verify, especially when the merchandise is out of season. Such prices placed upon higher priced goods should, however, be thoroughly investigated and checked.

2. Check the physical inventory records along lines similar to those laid down in the preceding operations.

3. If the inventory has been taken on the cost or cost-or-market basis, and the inventory sheets or tags show the cost codes taken from the merchandise tags, determine if decoding to the unit cost has been correctly performed.

4. When the inventory has been priced by the "retail method," check over the form used in arriving at the average per cent of mark-up to retail for the period. See if it agrees with the form as shown in the inventory section of this book—a form for computing inventory according to the retail method. The treatment of mark-downs, mark-down cancellations, additional mark-ups, and additional mark-up cancellations should be very carefully inquired into. See that mark-down cancellations have not been considered as mark-ups; also that additional mark-up cancellations have not been taken in as mark-downs. See that mark-downs are not used so that they effect the average per cent of purchase mark-up.

5. Verify all figures used in arriving at the average per cent of mark-up. Inspect all documents and records supporting the retail method, and satisfy yourself that the departmental charges and credits for merchandise are correct. Investigate for instances of intentional juggling of amounts between departments in order to create false figures of per cent of mark-up to retail. Consider each of these following matters with care:

a. Opening Inventory. This should agree with the closing physical inventory of the past period—cost, mark-up, retail, and per cent of mark-up to retail.

b. Purchases. This figure should be net purchases, charged to the department during the period. It should not be increased by "buying expenses," such as buyers' salaries, traveling expenses, etc. If purchases are "loaded," determine on what basis. Transportation charges should be included with purchases.

c. Transfers Received. All transfers of merchandise *received from* other departments should be taken in at both actual cost and retail. Verify total with transfer records.

d. Additional Mark-ups and Additional Mark-up Cancellations. These figures should be verified by means of their supporting records, *i.e.*, Record of Additional Mark-ups and Record of Additional Mark-up Cancellations.

e. Net Sales. Total sales should be made up of charge, cash, C.O.D., instalment, mail order, employee, and contract sales. This figure should include sales, at discounted prices, made to employees of the concern.

f. Mark-downs—Net. This figure is the difference between mark-downs and mark-down cancellations. Mark-down records should be examined and the total verified with the gross amount shown here. Cancellation of mark-downs should also be verified by comparison with supporting records. Discounts given employees on merchandise sold to them should be considered as mark-downs.

g. Transfers Out. All transfers of merchandise made *to* other departments should be credited at both actual cost and retail. Verify the total with the transfer records.

h. Calculations. Verify all additions, subtractions, and other mathematical calculations used in the form for computing inventories according to the retail method.

i. Per Cent of Mark-up. See that the average per cent of mark-up is to "retail" and not to "cost."

j. Physical Inventory. See that the inventory for balance sheet purpose has been determined by applying the complement per cent of the average per cent of mark-up to the amount of the *physical inventory at retail*, and not to the book inventory at retail.

6. Determine if the average per cent of mark-up used in establishing the complement per cent for reducing the retail inventory to cost is the average per cent for the entire operating period or for the latter portion of the period only. The average per cent calculated on the basis of accumulated figures over the entire period is the more correct method.

7. Determine if purchases have been charged to a department at "gross" or "net." If they have been charged in at "gross," determine if a reserve has been established to reduce the physical inventory by the amount of discounts being carried in the inventory when it was taken. This reserve is generally computed by applying the average per cent of discounts during the period to the gross cost inventory at the end of this period.

8. Determine how the concern has handled special sales of low mark-up merchandise as far as their effect upon the average per cent of purchase mark-up is concerned.

9. Determine if the matter of departmentalizing for average per cents of purchase mark-ups has been sufficiently worked out.

10. Where the "cost-or-market, whichever is lower" basis is used, see that the "cost" of merchandise carried over from the last inventory is the price at which it was taken in the inventory at that time.

11. Determine if the book inventory amount has been adjusted to accord with the final physical inventory figure.

12. If the "retail method" has been used in pricing the inventory for income tax purposes, determine if all procedures are in accordance with decisions and regulations of the Treasury Department and the Bureau of Internal Revenue. In this respect refer to:

a. Treasury Decision 3058.....Aug. 16, 1920
b. Treasury Department's letter to National Retail Dry Goods Association.....Jan. 21, 1921
c. Treasury Decision 3296.....Mar. 3, 1922
d. Income Tax Mimeograph No. 3077.....Mar. 23, 1923

GENERAL INVENTORY NOTATIONS

1. Tag stubs will usually be found, at the time of audit, still attached to materials which are obsolete, secondhand, out of style, and also attached to used tools and equipment of a capital nature. An inspection of the plant should be made and notations made of all tags attached to material of questionable value or classification, for later adjustments to, or eliminations from, the inventory, to place it on a fair valuation basis.

2. In checking prices of small articles, such as bolts, nuts, cotter pins, etc., purchased in units other than single prices, make sure that the unit price used for pricing is the same as the unit used for reporting the material on the inventory tags. For example, 2,500 cotter pins are reported on a tag. These cotter pins were purchased at $1.20 per thousand. The calculation on the tag should be $2.5 \times \$1.20 = \$3$. A very common error is to find the above calculated as follows: $2{,}500 \times \$1.20 = \$3{,}000$. Mistakes of this character are quite common, and every tag should be carefully scrutinized for such errors in prices and extensions.

3. As an additional check, the unit prices of all standard materials, direct and indirect, should be mentally associated

with the articles themselves. Flagrant errors in unit prices may be very easily discovered by this means.

4. In checking the prices of obsolete material, consider its value for other products, its value for spare parts of obsolete models or products, its quantity, its durability, its resale value to other concerns, and its scrap value.

5. Inquire if there are any indications that selling prices will be increased or decreased within the near future.

6. Determine if the inventory is poorly assorted, out of date and style, or substandard.

7. Material eliminated because found defective, awaiting return to vendors, should be charged back to those vendors. Determine if the book inventory has been credited and the respective vendors debited.

8. Knowledge of the average number of days required to process product from the raw material to the finished article will assist, when used in conjunction with production reports, in estimating the amount and value of work-in-process.

9. Give special attention to the following:

a. Material in transit—inward.
b. Material in transit—outward.
c. Material shipped but not billed.
d. Material billed but not shipped.
e. Material located at places other than the main plant.
f. Purchase contracts for materials.
g. Advances made on purchase contracts.
h. Material received on consignment.
i. Material shipped on consignment.

10. Where a concern maintains an "Inventory Adjustment Account" a careful analysis of this account should be made in order to gage the effectiveness of the system being used and also the dependability of the book inventory figures.

Reconciling the Physical Inventory with the Book Inventory.—After the physical inventory has been completed and summarized, the total thereof should then be compared with the balance of the inventory account in the general ledger (generally called the "book inventory"). If the two figures agree, then a most unusual thing has happened. Actually, this agreement of figures occurs so seldom that it is safe to say that the physical inventory is *always*

higher or lower than the book inventory. With possibly a few exceptions, the physical inventory is the lower of the two figures.

The next thing to be done is to establish the exact amount of difference between the two figures, for upon the size of this amount depends the next step to be taken. If the difference is small it is customary to adjust the book inventory at once by charging either the "cost of goods sold" directly, or some statistical account first (it is presumed that the physical inventory is the smaller figure) and crediting the inventory account. For example:

Book Inventory, Dec. 31, 1923	$2,510,550
Physical Inventory, Dec. 31, 1923	2,500,100
Difference	$ 10,450

Since this amount of $10,450 is so small a difference (about 0.04 per cent) no attempt would usually be made to run it down. As a result the following journal entry would be made and the book inventory brought into agreement with the physical inventory:

Cost of Goods Sold	$10,450	
Inventory		$10,450

If the debit is to be passed into a statistical account first before finally reaching the cost of goods sold account, the following entry would probably be made:

Inventory Adjustment Account	$10,450	
Inventory		$10,450

Usually the inventory adjustment account is closed out to the cost of goods sold, although in some instances the former account is charged against a reserve which has been established especially to take care of inventory shrinkage.

Although it is customary to proceed as above in cases where the physical inventory agrees very closely with the book inventory, there is always a possibility that compensating errors have been made. However, where the physical inventory approximates the book inventory, little thought is generally given to such possibilities.

Large Differences.

When the difference is a large one, no adjustment should be made to the inventory account until all errors causing the

difference have been located and corrected, and the book inventory figure and the physical inventory figure reconciled. Let the following figures be taken:

Book Inventory, Dec. 31, 1923	$2,510,550
Physical Inventory, Dec. 31, 1923	2,305,500
Difference	$ 205,050

This difference, or $205,050, is an excessive difference (about 8 per cent) and is caused by one or a combination of a number of factors. These factors, the principal ones of which are given below, must be inquired into in the attempt to eliminate, or account for, the difference involved.

1. Failure to have the opening inventory amount in agreement with the prior physical inventory amount.
2. Failure to make a complete and accurate count of all materials in the physical inventory.
3. Using unit prices different than cost.
4. Quantity corrections in the physical inventory.
5. Price corrections and adjustments in the physical inventory.
6. Failure to charge book inventory with all invoices payable.
7. Failure to adjust books with respect to materials inventoried physically, for which no invoices have been received.
8. Failure to credit book inventory with all product, parts, etc., shipped outward, especially during the month preceding the inventory.
9. Failure to post all requisitions for indirect materials as credits to book inventory.
10. Failure to charge to book inventory all credit requisitions for indirect materials returned unused to stores.
11. Failure to credit book inventory with rejected material awaiting return to vendors.
12. Product, parts, etc., returned from customers for allowance, included in physical inventory but not posted to book inventory.
13. Including freight, duty, insurance, and other direct charges in pricing the physical inventory, but not including these same charges in the book inventory. The reverse may also exist.
14. Material and supplies in book inventory used on factory orders of a capital nature not credited to books upon completion of the orders.

15. Including capital charges in the physical inventory by error, the same charges not appearing in the book inventory.

16. Capital charges debited to the book inventory, but eliminated from the physical.

17. Shrinkage in the physical inventory as a result of spoilage in excess of the amount usually added to the unit material, labor, and overhead cost.

18. Write-off or elimination of obsolete direct and indirect materials from the physical inventory.

19. Failure to write off destroyed materials from the book inventory.

20. When consigned products to distributors, branch offices, etc., are carried on the books at selling prices, failure to make adjustments by reason of reduction or mark-down of sales prices on stock already shipped on consignment and inventoried as consigned material.

21. Charging the book inventory with cash advances made on account of purchase contracts.

22. Charging the book inventory with materials and products received on consignment from other concerns.

23. Lack, or insufficiency, of reserves to place the valuation of the inventory on a conservative basis. These reserves pertain to the following:

a. Physical depreciation of materials.

b. Write-off of high cost of inventories carried over from previous years.

c. Extraordinary purchase commitments for raw material at high prices carried over from the previous year.

d. Necessary changes in models and the introduction of new models on a falling market.

e. Unsalable product.

f. Write-off of obsolete direct and indirect materials.

g. Write-off of discontinued lines, models, and products.

h. Writing down to market prices materials purchased at a higher figure.

24. Crediting the book inventory for the cost of goods with amounts at variance with the actual costs. Where the cost system is lame and actual costs are not obtained, the book inventory is usually credited with estimated costs. These may be higher or lower than actual costs.

25. Debiting the book inventory account with the selling price, instead of the cost for all goods returned from customers.

26. Where the cost system is working well and the control accounts are accurate, the incorrect costing of requisitions from stores.

27. Including in the inventory materials sold and billed, but not shipped, at the date of the inventory.

After inquiring into each factor and analyzing the respective figures in connection therewith, it will usually be found that the book inventory figure and the physical inventory figure are *both* incorrect. The adjustment to the inventory account, however, should not be made until after the inventory reconciliation statement has been prepared. An example of a reconciliation statement will be found on the next page.

The original difference of $205,050 having been inquired into and found incorrect (see following page) the next step is to take the corrected difference, or in this case $155,400, and make the proper adjustment to the inventory account in order to have the book inventory show an amount of $2,358,500—the *final* physical inventory figure. The adjusting journal entry would be as follows:

Cost of Goods Sold	$155,400	
Inventory		$155,400

If a reserve has been created to take care of all inventory differences caused by declines in market prices then the following entry—considering the figures above—would be made:

Cost of Goods Sold	$56,900	
Reserve for Inventory Fluctuations	98,500	
Inventory		$155,400

INVENTORY RECONCILIATION STATEMENT

Inventory (as per ledger account) Dec. 31, 1923....		$2,510,550	
Additions:			
a. Inventory charges not entered...	$ 5,200		
b. Goods returned to stock (at cost) not entered.....	400	5,600	
		$2,516,150	
Deductions:			
a. Capital charges erroneously entered.....	$ 1,500		
b. Cost of goods sold and shipped not credited to account.....	750	2,250	$2,513,900
Inventory (physical inventory before reconciliation) Dec. 31, 1923		$2,305,500	
Additions:			
a. Material not included in original physical inventory.....	$47,500		
b. Errors in addition.....	3,000		
c. Errors in extensions.....	4,500	55,000	
		$2,360,500	
Deductions:			
a. Items of capital material in inventory.....	$ 1,500		
b. Errors in additions.....	500	2,000	2,358,500
Net difference between physical and book inventories.....			$ 155,400
The above difference accounted for as follows:			
a. Pricing raw material at market prices.....		$ 98,500	
b. Estimated undercosting of finished product in the inventory.....		32,000	
c. Estimated excessive spoilage.....		20,000	
d. Unaccounted for.....		4,900	
		$ 155,400	

PART II
MATERIAL CONTROL

CHAPTER XVI

MATERIAL CONTROL

Benefits from Control.—There are five principal benefits to be obtained by exercising constant control of materials. These benefits are: (*a*) keeping the investment in inventories down to the lowest minimum consistent with production and sales requirements; (*b*) preventing interruptions to production schedules and sales programs as a result of shortages in materials and merchandise; (*c*) preventing and minimizing losses due to physical depreciation and obsolescence of stock; (*d*) keeping working capital in a more liquid condition; (*e*) obtaining at any time the amount of the inventory for financial statements and administrative purposes. In connection with (*a*) and (*b*) above the following statements taken from the pamphlet *Perpetual Inventory or Stores Control* published by the Chamber of Commerce of the United States are of special interest. With reference to the matter of keeping the investment in inventory down to the proper level it says:

In the first place a Stores Control System should aid in keeping the investment in materials and supplies to a minimum consistent with efficient operation. Consumption of material is not static but fluctuates with production.

The supply of specific commodities on hand is largely regulated by conditions of purchase, production, and demand, and as these change so should the level of supply. When goods are scarce and deliveries uncertain a larger reserve of material is necessary than when goods are plentiful and deliveries dependable, and obviously when demand falls below actual or planned production future commitments for material must be curtailed.

By simply ceasing to purchase, a general reduction of material on hand can be effected, but to this method is attached the risk of running out of necessary material. The stores control system will readily give the supply on hand of specific items and a complete record of their consumption, so that adjustments may be made where the supply is top-heavy or the reserve unnecessarily large. Thus, one company found it necessary to maintain a year's supply of steel files

when files were at a premium; now it finds that files are more easily obtainable and that its consumption of this item has dropped, consequently a three months' supply is ample.

But a Stores Control System can aid a minimum investment in material in another direction, for a well-planned system of material control will do more than fill and record the demands of foremen. The attempt will likewise be made to guide the selection of stock so that there may not be a needless range of variety or a surplus of stock. The subject of a minimum investment in material is closely related to the subject of standard sizes and varieties.

Concerning the subject of the relation of the inventory to production it is further stated that:

The second requirement of an adequate Stores Control System is to supply men and machines with material in the manner, at the time, and in the amount required.

The investments in materials must be kept low, but not so low as to interfere with production. Machines must not remain idle because of lack of necessary material. The Material Control System takes on an increased importance where there are numerous parts entering into production, the lack of any one of which is sufficient to check operations and throw the production program out of balance.

Parts must not only be physically available in the storeroom, but must converge to the point and at the time desired in production. An undue accumulation of material in the course of production will serve to interrupt the flow of production. The cost line of the sluggish movement of materials is not generally recognized, but an enterprise is impoverished by it as is an individual suffering from a weakened condition.

Economy of material investment, particularly of parts, cannot be determined on a strictly interest charge basis. There is something bigger at stake—the most economical use of production facilities. A three months' supply of a specific part may be a high enough level to meet the usual demand, but a six months' or a year's supply may be fabricated far more cheaply and permit of greater plant output.

The third benefit of material control concerns itself with preventing and minimizing losses due to physical depreciation and obsolescence of stock. Under a control system functioning in proper manner physical verification of material is continuously made. Thus is afforded an opportunity for saving thousands of dollars by discovering material which is deteriorating because of improper care or storage and correcting such conditions at once. Through lack of attention, leather, for example, will dry out and crack; polished steel surfaces will become rusted and pitted; paints, oils, chemicals and other liquids will evaporate

and deteriorate in quality; fragile articles will be broken or crushed. All these can be prevented; or at least the loss, as a result thereof, can be greatly reduced through constant inspection of materials while making periodical physical counts of the inventory for the purpose of verifying the material ledger quantities.

One of the principal losses to present-day manufacturers is that loss occasioned through material becoming obsolete. Changing styles and types of product, designs, and specifications, generally make useless those materials purchased for a purpose which later is not or cannot be carried out. While a control system cannot prevent losses from obsolescence in all cases it can do much to keep such losses down to a minimum by supplying information which is necessary for prompt administrative action.

Another advantage of a Material Control System is that records are available which permit of obtaining at any time the amount of the inventory for financial and operating statements. Present-day business requires the determination of profits more often than once a year. Most progressive companies secure a monthly statement of operations and profits. To do so, it is of course necessary that the exact amount of inventory be known because estimated inventories result in estimated profits, and the latter may be so misleading as to be dangerous to use, especially where the figures are being used as a basis of financial planning. By means of the perpetual or material ledger inventory which is an integral part of a Material Control System, it is possible to keep the "Inventory Controlling" account in balance with the actual details making up the entire inventory. Thus, adjustments to the "Inventory Controlling" account may be made month by month instead of but once a year. As a result monthly profits can be determined more accurately. Where there are no supporting details to the "Inventory Controlling" account, adjustment thereto can be made only in one lump sum at the time a physical inventory is taken. Under the latter scheme it will be readily seen that accurate monthly profits cannot be obtained.

Material Control System.—Such procedures and forms, taken collectively, necessary to the proper regulation of material from the time it is ordered until it is sold or otherwise disposed of, may be said to be a material control system. The most essential thing required of a control system is adequacy. A system found

lacking in any respect prevents complete control and the service which is expected from it is not obtained.

To be most beneficial and economical a material control system must be simple, for if burdened with too great a number of procedures and forms it will, in most cases, do more harm than good, and eventually meet with general condemnation. Where simplicity ends and complexity begins is many times a difficult matter to decide. It can be determined only after a thorough and detailed study has been made of every peculiar condition. Such determination, of course, requires the judgment of competent persons. Unfortunately this is not always to be had, and the system, as a result, is generally designed entirely out of all proportion to the true needs of the business.

One of the principal objections against a complete control system (there are many systems which are incomplete because of the lack of tie-up with the accounting records) is not so much the cost of installation as the cost of operation. It is true that it does cost a considerable amount of money to successfully operate a *complete* system, but that cost by itself should not be the only thing for serious consideration. It should be compared with the cost that *might* result if the concern is without the system. The latter cost, which unfortunately cannot be calculated with any degree of accuracy, but which is far greater than ever imagined, is made up chiefly of (*a*) loss of production, (*b*) spoiled, damaged, and obsolete materials, (*c*) excessive interest, depreciation, taxes, insurance, maintenance, and storage as a result of excessive inventories, (*d*) lost sales, and (*e*), loss of goodwill by reason of inability to make prompt deliveries.

Material Control Applicable to Small Concerns.—It is the belief of many that material control is applicable only to the larger concerns and not to the smaller ones. Some systems of material control are so expensive to instal and operate that this belief is not entirely incorrect when the application is considered in terms of money. From the standpoint of its help to the management and the operating departments a control system is as applicable to one concern as to another although possibly not in the same degree. The smaller concern, to a certain extent, has possibly more right in undertaking to purchase material considerably in excess of immediate requirements, thus avoiding the expense necessary to operate a Material Control Department, than has the larger concern. However, in this instance the lack

of a continuous control of stock on the part of the small concern may be the direct cause of financial hardship or perhaps, later, failure.

Objections to Material Control System.—Of all the objections against a material control system the following are those worthy of consideration:

1. Cost of installing the system and operating it.
2. Its unreliableness.

The matter of cost has already been discussed—at least in so far as deciding in favor of, or against, a well-designed, complete, and economical system is concerned. However, it is too true that a goodly percentage of control systems are too costly to operate for the amount of accurate information obtained therefrom. If the installation and operation of a system are placed in incompetent hands it is only natural to expect that the cost thereof will be in inverse ratio to the degree of competency of the parties charged with the work. The case parallels the design and operation of machinery. The competent machine designer can construct his machine to do the work required better and more quickly, and can build it with fewer parts than a less competent person. Such a machine, as a result, will operate at less expense because it will consume less power, and in addition it will require less maintenance expense. The first objection, therefore, can be eliminated by placing the design of the system in the hands of qualified parties.

Unreliable figures and data are chiefly caused by the failure of employees to appreciate the importance of accuracy. Through lack of attention these employees will fail to record each and every transaction thus permitting the records to become incomplete and inaccurate. When this occurs the operation of the system is a needless expense and the figures dangerous to use.

It has been said that a perpetual inventory requires perpetual attention. Nothing truer could be said. Unless each employee knows at all times exactly what he is doing, and how he is to do it in an accurate and complete manner, only unsatisfactory results may be expected.

The principal reason for unreliable figures are two:

1. Failure to instruct employees properly.
2. Improper supervision.

These two faults can be overcome easily with a reasonable expenditure of effort on the part of the management.

Pivotal Point of Material Control System.—The material ledger is the pivotal point of a material control system and as such its development will be briefly traced. There are many reasons for the development of the material ledger, from the first simple form purporting to show the quantity of different kinds of material on hand at any time, to the present-day elaborate record which forms the foundation for the exercise of control over material and its movements. Whatever these reasons may be, is not pertinent to the present matter, but it is quite evident that the development in the size of manufacturing and commercial establishments is not the least of considerations.

The first material record used was designed simply to give the balance on hand of the different materials, day by day, thus making it unnecessary for the storekeeper, or the proprietor, to make an actual physical count each time it was necessary to know how much material was on hand to fill an order. Cases are known where this form was so simple that but one line was allotted on a sheet of paper for each kind of material, and the balance on hand was corrected from day to day by the simple expedient of erasing the old balance and substituting the new balance. On this form receipts and issues of materials were not shown in any way except in so far as they affected the balance on hand, which was changed as described above. Needless to say, this form was found quite inadequate as business increased.

The next development in this record was the card index. Here, perhaps, is the beginning of the so-called "perpetual inventory." This record of material was made up of individual cards for each different kind of material. These cards, in addition to giving a description of the material, were designed to show by quantities the individual receipts and issues, and the balance on hand. This balance-on-hand feature, supported by entries of receipts and issues, gave the record the name of "perpetual inventory"—a name which could have been more appropriately chosen, but which still persists and no doubt will continue to persist.

From this second development has evolved the elaborate material ledger form of the present day, the principal features being two: (*a*) the apportioning or reserving material on the ledger before its issue from the stock room; and (*b*), the substitution of material *available* for material *actually on hand.*

Information Furnished by a Material Control System.—The amount of information which a material control system furnishes through the material ledger is considerable and extremely useful for administrative purposes. The principal items of information which a well-designed ledger form supplies, and the matters of special value from the standpoint of administration which are also available from this form, are the following:

1. Quantity and amount of material still on order.
2. Quantity and amount of material received for any given period.
3. Quantity and amount of material issued for any given period.
4. History of all purchases and returned purchases.
5. History of all prices.
6. Record of vendors of material (for the small concern).
7. Balance of material on hand—quantity and amount.
8. Quantity of material reserved in advance of immediate requirements.
9. Quantity available for future requirements.
10. Quantity of material needed for unfilled and uncompleted orders, (thus preventing shortages).
11. Record of slow-moving materials.
12. Record of obsolete materials.
13. Information essential for accurate cost accounting.
14. Information essential for proper planning and production.
15. Positive supporting data for the inventory controlling account.

The material ledger is the pivotal point of a material control system, but this record alone will not make the system a success. There must be a well-conceived and well-operated method of ordering, purchasing, receiving, storing, issuing, and shipping. The following chapters, commencing with a discussion of the material ledger, describe in detail the necessary procedures in connection with these six principal divisions of material control, which control is many times inaccurately called a Perpetual Inventory System.

CHAPTER XVII

THE MATERIAL LEDGER

For the same reason that a book of account containing the individual accounts of customers is called an accounts receivable ledger, so a book of account containing the detail accounts applicable to materials is called a "material ledger." The term "book" must, of course, be considered here in its broadest sense because the bound book of account has universally given way to the loose-leaf book and the card system. It is difficult to give an exact definition of the form of a material ledger. Hence, whenever, then, the term "material ledger" is used in this book it should be understood to mean the individual material accounts taken collectively.

As has been previously stated the material ledger is the pivotal point of a Material Control System and the form upon which is found the perpetual inventory. This form goes under a variety of names among which will be found the following: Perpetual Inventory record; Stores Ledger sheet; Balance of Stores form; Stores record; Stores Balance sheet; and Material Ledger sheet. Discussion of the merit of each of the various names is unimportant. The arrangement or design of the form, on the other hand, is most important, and although the variety of designs is legion the majority may be said to furnish practically the same kind of information in one form or another. Whether or not the information so furnished is adequate is another matter.

An attempt to throw these variously designed material ledger forms into broad classifications for the purposes of discussion meets with certain obstacles. Some writers, for example, assume two classifications for the purpose of exposition—the simple form and the complex form—without definitely defining what each of these classifications includes or excludes. Another classification attempt is that of separating those forms designed for showing quantities only from those showing both quantities and prices. Although in this case there is undoubtedly a clearly drawn line of demarkation between the two groupings, and the distinction is an important one, it is not important enough to be considered the basis of a classification which allows of a more logical inquiry into the advantages or disadvantages of the

forms. A third classification also clearly and unmistakably drawn, but also too general for the purposes of discussion, is that of attempting to group those forms designed for cumulative totals and those not so designed. With one possible exception, it is the author's opinion that any attempt to classify material ledger forms renders but little help in a discussion concerning them. This one exception, which it is felt is deserving of being used for classification purposes, involves the consideration of those forms (upon which material is apportioned before issue and where the balance available may be at variance with the actual material on hand) as distinct from forms upon which material is not apportioned and upon which the balance available is the actual quantity on hand. For the purpose of identifying each of these two classes in subsequent exposition they will be called respectively:

1. Forms designed without apportionments.
2. Forms designed for apportionments.

Each material ledger form is made up of two distinct divisions. The first may be called the heading division, or that portion of the form at the top allotted both for the purpose of describing the material and recording certain other necessary data. The second division may be called the columnar division, the arrangement and design of which determines the class into which the form falls. The advantages and disadvantages of several designs of the latter will be considered in conjunction with a description of the material ledger forms to follow.

Material Ledger Form-Heading Division.—Generally, whether for the Raw Material Ledger form, the Finished Parts or Material form, or the Operating and Maintenance Material Ledger form, the information required for the heading division is:

1. Sheet number.
2. Name of material.
3. Description.
4. Size.
5. Weight.
6. Material or part number.
7. Model, style, type or product.
8. Specification number.
9. Unit of measure.
10. Maximum limit.
11. Minimum limit.
12. Quantity to order.
13. Time required to get material.
14. Rate of consumption.
15. Storage location.
    - *a.* Building.
    - *b.* Storeroom.
    - *c.* Floor.
    - *d.* Section.
    - *e.* Shelf.
    - *f.* Bin.
16. Nature of material.
17. Stock verification with book quantity.

Just how many of the above items are needed in each case is a matter which depends upon, and can only be decided after, the requirements of the particular case have been studied. Too often the heading design affords so meager an amount of information that either an opening is given for posting to the wrong material account, or information demanded quickly is not available. The evidence of a poorly designed heading may often be seen from the appearance of the material ledger form upon which is to be found, in unusual places, information that is deserving of allotted sections of the heading division.

1. *Sheet Number.*—In many cases it is advisable that each sheet be given an identifying number. Whether for the purpose of facilitating posting, or as a means for detecting that sheets have been lost, misplaced, or removed, it will be found advantageous to employ sheet numbers.

2. *Name of Material.*—Sufficient space should be allotted for recording the complete name of the material, part, or product. In many instances this is not done with the result that time is lost in locating the proper page, and errors are often made in posting—all because of too limited a space for the names.

3. *Description.*—One of the most noticeable things in a great majority of Material Ledger forms is the lack of a complete description of the material. Too often this is caused by insufficient space. The result of this lack of space has been stated in Name of Material above. Above all, the description should be complete, for a slight difference in the same kind of material renders one quite distinct from another.

4. *Size.*—Many materials similar in name and use are distinguished by size only. Space should be allotted for the complete size.

5. *Weight.*—While in many cases the weight is of no material importance, in others it may be the means of distinguishing between materials of the same name. Angle irons and other structural shapes, for example, may have identical trade sizes, one with another, but are only distinguished by the weight per foot.

6. *Material or Part Number.*—A material or part number affords an additional check in locating the proper ledger page before posting. Also, where the name of the part is omitted on material documents the number is helpful in referring back to the documents for completion.

7. *Model, Style, Type, or Product.*—Reference made in the heading to the model, style, type, or product ties up the material or part to its proper group.

8. *Specification Number.*—A space should be allotted for the specification number applicable to the material. This number may be the only means of distinguishing, for posting purposes, between parts or

material similar in all other respects except the composition of the material itself.

9. *Unit of Measure.*—In most cases no special consideration need be given with respect to space for this data. In some instances, however, the unit of purchase is not the same as used for the unit of issue. Whether it is necessary to allow space for, and use, both units is one to be decided after the individual requirements are known.

10. *Maximum Limit.*—Space should be allotted for recording the maximum limit, a limit beyond which the quantity on hand (and in other cases, the quantity available) must not be allowed to exceed. As the maximum limit should naturally rise and fall with the rise and fall in demand, and where such a fluctuation in demand is not the exception, it may be necessary to allot sufficient space for making a record of each change in the maximum limit. The basis and method for establishing the maximum limit will be discussed subsequently.

11. *Minimum Limit.*—What has been said above applies also to the minimum limit, a limit below which the quantity on hand (and in other cases, the quantity available) must not be allowed to fall.

12. *Quantity to Order.*—As a guide to the requisitioner it is quite common for the Material Ledger form to give the quantity of material to be purchased when a purchase requisition is originated. Although in many cases it is a matter which the purchasing department, with its knowledge of market prices and conditions in general, must pass on with respect to the quantity to order, in other cases proper normal purchasing quantities may be fixed, included as data in the heading, and be used to excellent advantage.

13. *Time Required to Get Material.*—A space for showing the amount of time, from the date of placing the order until the material is received and in the stores, is required. Should there be several sources for the material, and should the time to obtain it from each vary, it will be necessary to allot more space for this information. Further discussion on this matter will be found in a subsequent chapter.

14. *Rate of Consumption.*—A space for this information is especially necessary when consumption for past periods is made the basis for determining the replenishing quantity. Especially applicable is this information with respect to operating and maintenance supplies.

15. *Storage Location.*—A record of the exact storage location of the material should be found on every material ledger sheet. This storage location designation should be specific. Unless this is done confusion and inconvenience may be expected, especially when such information is required for the purchase requisition, purchase order, notification of material received, requisitions, etc. Generally, the location description should include the building, floor, storeroom, section, shelf, and bin.

16. *Nature of Material.*—Where the material ledgers are being exercised to their greatest capacity they will be found to supply information

concerning the nature of the material from the standpoint of storage, *i.e.*, its ability to stand storage and its care during the time it is waiting to be requisitioned for use. Theoretically it may be argued that a material's stay in storage should be short-lived. Practically, however, certain materials are kept in storage for so long a time, either because not exhausted in the order of their purchase, because of specification changes, etc., that it is necessary they be treated from time to time in order to prevent deterioration. Rubber, leather, and highly polished surfaces are examples of materials requiring attention. Therefore some space should be set aside on the ledger sheet for giving information concerning the nature of the material.

17. *Stock Verification with Book Quantity.*—This section should give the date and quantity of material counted when an actual physical inventory is taken for the purpose of verifying the correctness of the book inventory figure. In addition it is customary to show the difference between the actual and book quantities. A record of this kind is valuable not only for its evidence of the dependability of the material ledger figures but also for showing what items require a more frequent verification than others. On some few forms in addition to the above is to be found information based on experience, as to when or how often the physical check should be made.

Material Ledger Form—Columnar Division.—While, as explained previously, the information required for the heading division of one material ledger form should differ but little from any other material ledger form this condition does not, as will be pointed out in the following paragraphs, exist with respect to the columnar division. Upon this latter division, including as it does the choice and arrangement of the sectional groupings themselves and the titles applicable to each, depends to a great extent the success or failure of the form, provided, of course, the heading information is not inadequate. The columnar division form should suit the conditions to which it is to be subjected. In many instances the form is chosen at random on the assumption that it will serve its purpose as well as another, with results detrimental to the whole scheme of material control. As the applicability of the form is mainly dependent upon the design and arrangement of the columnar division, and as this division in turn determines into which of the two classes (with or without apportionment features) the form is to fall, a discussion of each class by means of representative material ledger forms follows:

Material Ledger Form Designed without Apportionment.—The following material ledger forms A, B, C, and D fall within

the first class—the class which represents forms in the design of which no consideration is given for the apportionment or reservation of material prior to its issue from stores. Form A is considered first.

Material Ledger—Form A.—This form, perhaps the simplest of any, provides for four columnar sections, one for Orders, one for Received, and two for Issued.

Under the Ordered section are two columns, the first for the date when the material was ordered and the second for the quantity ordered. In the Received section are two columns headed similar to the columns in the Ordered section, that is, date and quantity

DESCRIPTION Side Arm Bracket-No. 3 MIN. 60
Brass Casting-Semi. Fin. #7145 MAX. 150
LOCATION Storeroom #5 Bin A5B2

ORDERED		RECEIVED		ISSUED		ISSUED	
DATE	QUANTITY	DATE	QUANTITY	DATE	QUANTITY	DATE	QUANTITY
Inventory		Jan. 1, 1923	100	1/7/23	10		
1/19/23	150	2/10/23	150	1/12/23	10		
				1/18/23	20		
				1/24/23	15		
				1/30/23	12		
				1/31/23	(Dr.) 2		
				2/4/23	10		
				2/8/23	10		
				2/14/23	15		

FIG. 44.—Simple form of material ledger sheet (Form A).

respectively. Because material is generally requisitioned from stores in much smaller lots than the quantities received from vendors, it is deemed necessary in most cases to allot more space for recording the issues of material. This has been done on Form A.

It will be seen, by making use not only of the form itself but also of the postings which appear thereon that the amount of information is very meager. Thereon is given the dates and quantities applicable to material ordered, received, and issued. This, however, is not enough. In fact so little information is given on a form of this design that its usefulness is limited to the very smallest concerns. It is to be pointed out in passing that the balance of material is not determined without a calculation, and also that no prices are shown. Other shortcomings will be evident after the other forms have been examined and discussed.

Material Ledger—Form B.—Form B has several features which are evident advantages over Form A. First, to the date when material is ordered has been added the additional information concerning the purchase order number and from whom the material is purchased. With the latter data this form is adaptable to small concerns who desire to use the form not only for a stock record but also as a commodity file for the purchasing department. It will be noticed that this form allows for recording the average cost per unit of the balance of material on hand in addition to cost per unit of material for each purchase made. The average unit price is established, of course, for the purpose

STORAGE LOCATION: A5 B2 — TIME REQUIRED TO GET MATERIAL: 20 days — MAX. 150 — MIN. 60 — ORDER 150

ARTICLE: Side Arm Bracket — DESCRIPTION: Brass Casting - Semi-Fin — PART NO. 7145 — MODEL 18 — SIZE No. 3 — UNIT Ea. — WEIGHT 3¾#

DEBITS								CREDITS				BALANCE	
PURCH. ORDER NO.	PURCH. ORDER DATE	DATE REC'D.	PURCHASED FROM	PER UNIT COST	QUAN.	AVER. COST PRICE		DATE ISSUED	REQ. NO.	ORDER NO.	QUAN.	QUAN.	AMOUNT
		1/13	Inventory		100	2.50		1933 1/3	1481	A712	10	90	225 —
5191	1/9	2/10	Acme Mach. Co	2.40	150	2.41		1/12	1512	A715	10	80	200 —
								1/18	1599	A721	20	60	150 —
								1/24	1632	A730	15	45	112 50
								1/30	1695	A742	12	33	82 50
								1/31	(Adj.)	A742	2	35	87 50
								2/4	1789	A751	10	25	62 50
								2/8	1856	A764	10	15	37 50
								3/14	1917	A780	15	150	361 50

FIG. 45.—Material ledger sheet—with perpetual balances (Form B).

of pricing requisitions applicable to material drawn from stores. If it is the practice to price material out at actual unit cost instead of at average unit cost this column is unnecessary.

Two additional features with respect to the issuance of material are the columns for recording both the stores requisition number and the order number (job, lot, or order). The former column affords a verification against the requisitions; the latter column, a verification against charges on the cost ledger. To determine on this form the balance of material on hand one has only to refer to the Balance column, which is increased as a result of new receipts and decreased as the material is withdrawn from stores, the balance being brought down after every transaction. Not only is quantity of material on hand given but also the

value—in this case computed by multiplying the quantity by the average unit cost.

Material Ledger—Form C.—This form is commonly known as the cumulative form, for the reason that the totals of all orders, receipts, and issues are accumulated by the process of adding

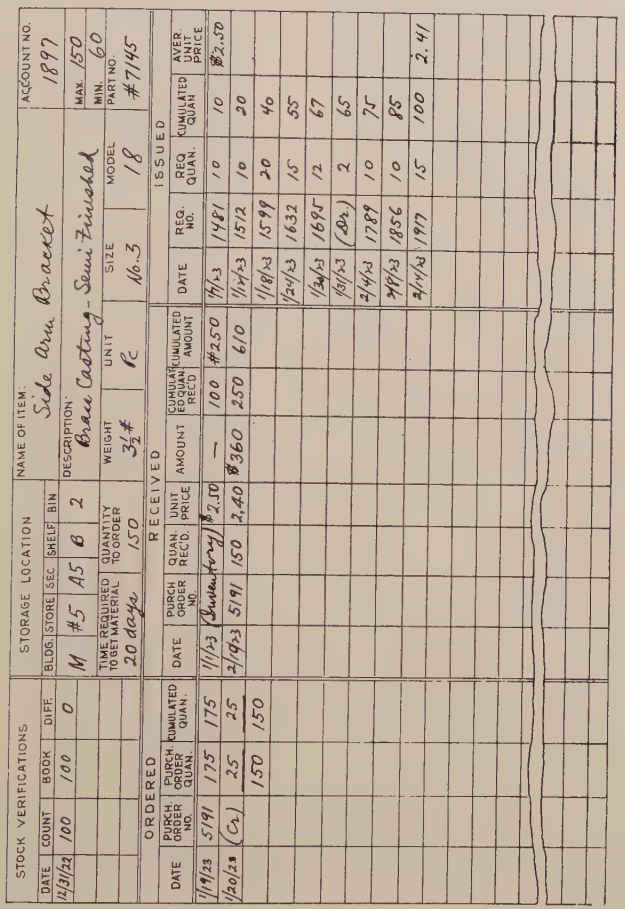
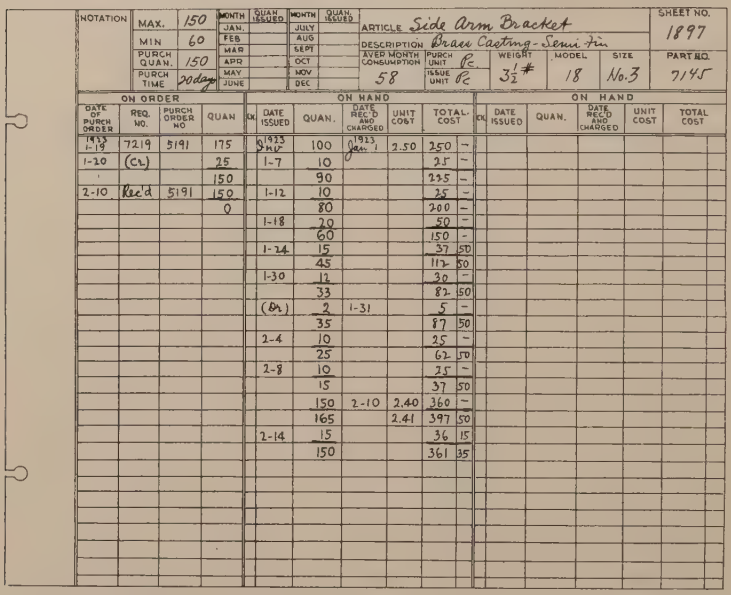


Fig. 46.—Material ledger sheet (Form C).

new orders, receipts, and issues to the previous totals, respectively. These cumulated totals are made available by the use of the special columns placed there for that purpose. With the exception of the cumulated totaling feature, this form does not differ to any marked extent from Form B. It must be noted, however, that the name of the vendor as afforded on Form B

is not available, nor is the balance, either in quantity or dollars, directly obtainable. This form, however, has an advantage not attached to others. The cumulated columns very readily permit one to determine the quantity of material ordered, received, or issued over any given period. Where information of this kind is needed quickly, this form is found advantageous to use.

Material Ledger—Form D.—Here we have a form which differs radically from Forms A, B and C. Its outstanding feature is



NOTATION — MAX. 150 — MIN 60 — PURCH QUAN. 150 — PURCH TIME 20 days

MONTH	QUAN. ISSUED	MONTH	QUAN. ISSUED
JAN.		JULY	
FEB		AUG	
MAR		SEPT	
APR		OCT	
MAY		NOV	
JUNE		DEC	

ARTICLE: Side Arm Bracket — SHEET NO. 1897
DESCRIPTION: Brass Casting - Semi fin — PART NO. 7145
AVED MONTH CONSUMPTION: 58 — PURCH UNIT: Pc. — ISSUE UNIT: Pc. — WEIGHT: 3½ # — MODEL: 18 — SIZE: No. 3

ON ORDER				ON HAND						ON HAND					
DATE OF PURCH ORDER	REQ. NO.	PURCH ORDER NO	QUAN	EX.	DATE ISSUED	QUAN.	DATE REC'D AND CHARGED	UNIT COST	TOTAL COST	EX.	DATE ISSUED	QUAN.	DATE REC'D AND CHARGED	UNIT COST	TOTAL COST
1933 1-19	7219	5191	175		1933 Jan 1	100	Jan. 1	2.50	250 —						
1-20	(Cr.)		25		1-7	10			25 —						
			150			90			225 —						
2-10	Rec'd	5191	150		1-12	10			25 —						
			0			80			200 —						
					1-18	20			50 —						
						60			150 —						
					1-24	15			37 50						
						45			112 50						
					1-30	12			30 —						
						33			82 50						
					(Dr.)	2	1-31		5 —						
						35			87 50						
					2-4	10			25 —						
						25			62 50						
					2-8	10			25 —						
						15			37 50						
						150	2-10	2.40	360 —						
						165		2.41	397 50						
					2-14	15			36 15						
						150			361 35						

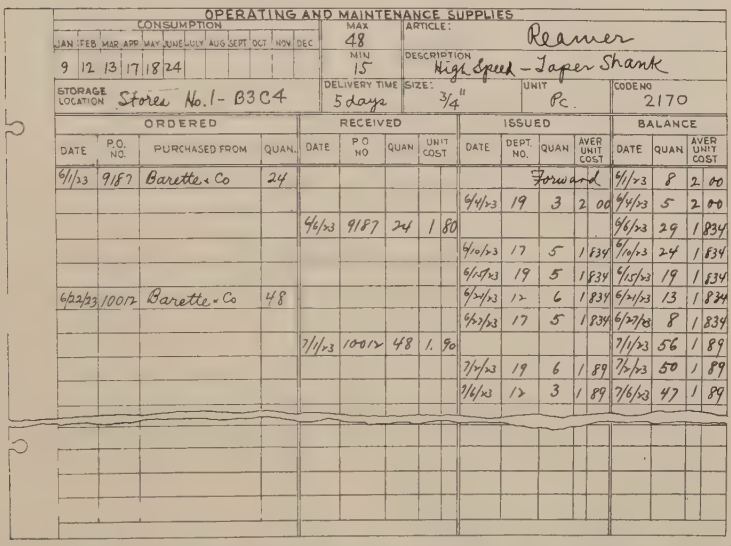
FIG. 47.—Material ledger sheet—with direct additions and deductions (Form D).

the use of the same column for recording the opening inventory, receipts, issues, and all balances of material on hand. Beginning with the opening inventory it will be seen from the form itself that new receipts of material are added to the balance on hand, and issues are subtracted, a new balance being brought down after each transaction.

That the columnar arrangement of this form is not too radical a departure from the more commonly accepted forms is evidenced by the number of concerns that have adopted it and are finding it satisfactory. There are several good features to be found in the other forms which are lacking in this one. These are, ease

in establishing the amount, in dollars or quantity, of material issued over a given period; and ease in establishing the amount of receipts. To determine from this form, for example, the quantity issued within a period, it is necessary to select from the column all issues made, transfer this information to another sheet, and establish the total. The chance of error is, of course, to be reckoned with. On the other forms, since all issues and receipts are kept separated, the total of either one or the other may be quickly established.

Material Ledger—Form E.—While this form—for operating and maintenance supplies—contains nothing in its columnar



OPERATING AND MAINTENANCE SUPPLIES

CONSUMPTION: JAN 9 | FEB 12 | MAR 13 | APR 17 | MAY 18 | JUNE 24 | JULY | AUG | SEPT | OCT | NOV | DEC

MAX 48 MIN 15

ARTICLE: Reamer

DESCRIPTION: High Speed - Taper Shank

STORAGE LOCATION: Stores No. 1 - B3C4

DELIVERY TIME: 5 days

SIZE: 3/4"

UNIT: Pc.

CODE NO: 2170

ORDERED				RECEIVED				ISSUED				BALANCE			
DATE	P.O. NO.	PURCHASED FROM	QUAN.	DATE	P.O. NO	QUAN	UNIT COST	DATE	DEPT. NO.	QUAN	AVER UNIT COST	DATE	QUAN	AVER UNIT COST
6/1/23	9187	Barette & Co	24									Forward	8	2 00
								6/4/23	19	3	2 00	6/4/23	5	2 00
				6/6/23	9187	24	1 80					6/6/23	29	1 834
								6/10/23	17	5	1 834	6/10/23	24	1 834
								6/14/23	19	5	1 834	6/15/23	19	1 834
6/22/23	10012	Barette & Co	48					6/21/23	12	6	1 834	6/21/23	13	1 834
								6/27/23	17	5	1 834	6/27/23	8	1 834
				7/1/23	10012	48	1 90					7/1/23	56	1 89
								7/4/23	19	6	1 89	7/5/23	50	1 89
								7/16/23	12	3	1 89	7/16/23	47	1 89

FIG. 48.—Material ledger sheet—for operating and maintenance supplies (Form E).

design which has not been discussed before, it is included for the purpose of bringing out several matters which are worthy of consideration. First, the name of the vendor is given under the Orders section for the purpose of allowing the requisitioner to include it on the purchase requisition. This information is often a time-saving feature for the purchasing department. Another feature, but in the heading division, is the section giving data concerning the actual monthly consumption. Used in conjunction with the rate of production this information may be used in gaging wastefulness on the part of the factory as a whole,

or, if necessary, the individual departments. In regard to the latter it should be noted that the deparment to which material has been issued from stores is given under the Issued section. One criticism of Form E is the large amount of space wasted. Its columnar arrangement permits hardly 50 per cent of the sheet to be used.

In passing it may be said, with respect to material ledgers containing the record of operating and maintenance, that it is quite common to find too meager a description of the article. This seems like a small matter, but in the larger concerns with their great variety of all kinds and makes of indirect materials it is essential that each article be so described as to preclude any chance of posting to the wrong account as a result of an incomplete description. For example, drills may be made of high-speed or carbon steel, may have a straight or taper shank, may be standard or special, may have other distinguishing features. To describe the article as a half-inch drill on a requisition should cause the requisition to be returned to the storekeeper by the material ledger clerk for additional information. The result, of course, is lost time to all parties concerned. This is not an exceptional case. The material ledger sheet should so describe the article that when making the posting there should be no question in the mind of the material ledger clerk as to the applicability of the requisition to the ledger sheet. The material ledger should give a complete description and the requisition should be made to match up with it before any entry is made.

Transactions Entered on Forms.—For the purpose of more clearly bringing out the application and range of the material ledger forms A, B, C, and D (but not Form E) the same transactions of receipts and issues, together with the opening inventory, have been used for each. These transactions in chronological order are the following:

January 1, 1923	Opening Inventory 100 pcs. @ $2.50 ea.—$250.
January 7,	Withdrawn from stores on Requisition No. 1481—10 pcs. Chargeable to Order No. A-712.
January 12,	Withdrawn from stores on Requisition No. 1512—100 pcs. Chargeable to Order No. A-715.
January 18,	Withdrawn from stores on Requisition No. 1599 20 pcs. Chargeable to Order No. A-721.
January 18,	Purchase Requisition No. 7219 for 175 pcs. forwarded to purchasing department.

January 19,	Purchase Order (copy) No. 5191 for 175 pcs. received from purchasing department.
January 20,	Received from purchasing department Purchase Order Change applicable to P. O. 5191. Change 175 pcs. ordered to 150 pcs.
January 24,	Withdrawn from stores on Requisition No. 1632 15 pcs. Chargeable to Order No. A-730.
January 30,	Withdrawn from stores on Requisition No. 1695—12 pcs. Chargeable to Order No. A-742.
January 31,	Returned to stores 2 pcs. withdrawn on Requisition No. 1695. Credit Order No. A-742.
February 4,	Withdrawn from stores on Requisition No. 1789 —10 pcs. Chargeable to Order No. A-751.
February 8,	Withdrawn from stores on Requisition No. 1856 —10 pcs. Chargeable to Order No. A-764.
February 10,	Received notice of receipt of 150 pcs. ordered from the Acme Machine Company on P. O. No. 5191. Per unit cost—$2.40 each.
February 14,	Withdrawn from stores on Requitition No. 1917—15 pcs. Chargeable to Order No. A-780.

Material Ledger Form Designed for Apportionments.—The outstanding and distinguishing features of this class of ledger forms are:

A. Apportionment or reservation of material is made to orders before the issue of the material from the storeroom.
B. The amount of material on purchase order plus the amount on hand in the storeroom less the amount of material apportioned on unfilled shop orders gives the balance available for subsequent orders.
C. The balance of material available for orders may not, and generally does not, coincide with the quantity on hand in the storeroom.
D. Apportionment of material to orders, and not the issue of material, decreases the balance available.
E. The ordering of material and not its receipt increases the balance available.
F. The placing of orders for additional material is dependent upon the *balance available,* not upon the *quantity on hand.*

It is well to state here that the word "apportioned" is not the universally accepted term for the operation of setting aside on the material ledger an amount of material necessary for a manufacturing order. The terms "applied," "reserved," and "allocated," are also used. In the present work, however, the term

"apportioned" will be used exclusively. In connection with the subject of apportionment Henry H. Farquhar, in his "Factory Storeskeeping,"[1] describes and illustrates this operation very clearly when he says:

> This apportionment is exactly similar to reserving or setting aside in advance from next month's salary check a sufficient amount of money to meet an insurance bill which we know will be due. The balance of the check plus what we may already have unassigned at the time, will then be available for other uses.
>
> By setting aside on the sheet or apportioning the needs of an order in advance, and obtaining an amount available which includes both the amount in the storeroom and the amount on order, we are thus not only working ahead of actual issue requirements during a period which theoretically is covered as regards issue in the setting of the low limit, but also by working definitely to known needs we are keeping the amount of inventory to the lowest possible point consistent with safety. The word "theoretically" is used in the last sentence, as even under such a method, it is of course not impossible to have a shortage of material, and the further we can look ahead the less danger there is of shortage. If a strict follow-up as regards traffic conditions and sources of supply and other related items is maintained, however, shortages under such a method of operation become exceedingly rare, and with a proper tickler system for following a purchase order, as will be explained, supplemented by frequent inventory checks and current measurement of amounts on hand against amounts apportioned such shortages may always be known several days in advance of the time materials will actually be needed.

Material Ledger—Form F.—Let us examine Form F. The columnar arrangement should first be noted. The first columnar section headed Ordered includes individual columns which supply information applicable to the ordering of materials, *i.e.*, the date, the purchase order number, and the quantity ordered. The next columnar section On Hand supplies information concerning the date, quantity, total cost, and order numbers of material received and issued, and the balance on hand. In addition it shows the cost per unit. The transactions of receipt and issue, and the bringing down of new balances occur in the same columns. Up to this point with the exception of a few minor items, the above is identical with Form D. The two remaining columnar sections, Apportioned, and Available, however, establish this form's classification.

[1] McGraw-Hill Book Co., Inc.

The Apportioned section furnishes a new source of information. It is arranged to allow entries to be made which reserve specified quantities of material for future production or other orders. The material itself is not physically set aside (although in some instances this is done) but out of the available supply enough

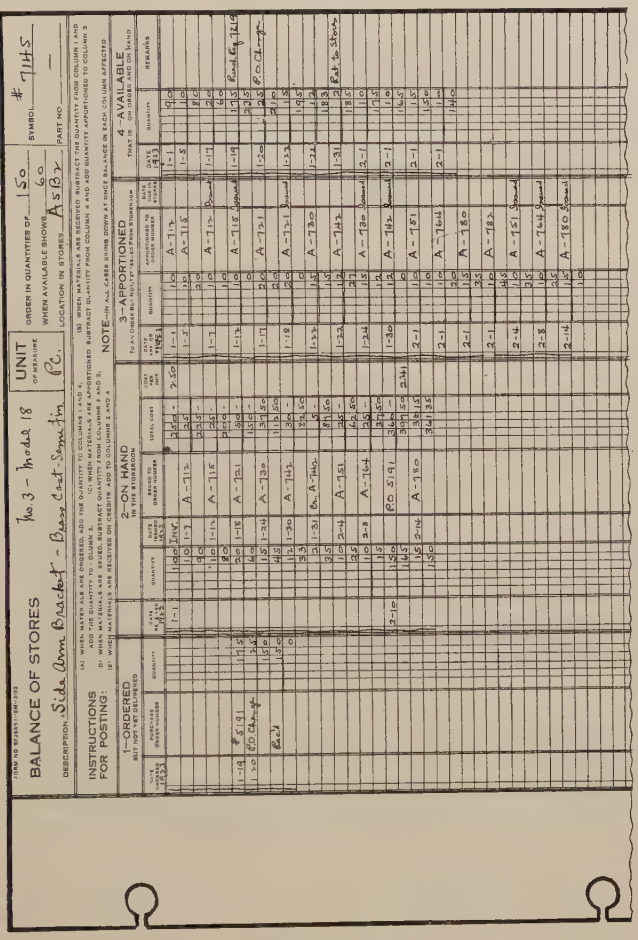

FORM NO. B1287-1-28-7732
BALANCE OF STORES
DESCRIPTION: Side Arm Bracket - Brass Cast Separate
No. 3 - Model 18
UNIT OF MEASURE Pc.
ORDER IN QUANTITIES OF 150
WHEN AVAILABLE SHOWS 40
LOCATION IN STORES A 582
SYMBOL #1145
PART NO —
INSTRUCTIONS FOR POSTING:
(A) WHEN MATERIALS ARE RECEIVED, ADD THE QUANTITY TO COLUMNS 1 AND 4.
(B) WHEN MATERIALS ARE REVISED, SUBTRACT THE QUANTITY FROM COLUMN 1 AND ADD THE QUANTITY TO COLUMN 3.
(C) WHEN MATERIALS ARE APPORTIONED, SUBTRACT QUANTITY FROM COLUMN 4 AND ADD QUANTITY APPORTIONED TO COLUMN 3
(D) WHEN MATERIALS ARE ISSUED, SUBTRACT THE QUANTITY FROM COLUMNS 1 AND 2.
(E) WHEN MATERIALS ARE RETURNED TO STORES, ADD TO COLUMNS 2 AND 4.
NOTE—IN ALL CASES BRING DOWN AT ONCE BALANCE IN EACH COLUMN AFFECTED
1—ORDERED BUT NOT YET DELIVERED
2—ON HAND IN THE STOREROOM
3—APPORTIONED TO ACCORDING TO ACTUAL REQUIREMENTS
4—AVAILABLE THAT IS ON HAND AND NOT APPORTIONED
REMARKS

Fig. 49.—Material ledger sheet—with apportionment features (Form F).

material is reserved on the books, to the exclusion of other orders, to allow each proposed future order to be completed without interruptions caused by the lack of material at the right time. Apportionments are not only charges against the balance of material available, but they also remain open on the material

ledger sheets until material has actually been issued from stores to cover them, or until the reservations are canceled. Hence in this section all new apportionments are *added* to the balance of the unfilled prior apportionments, and all issues from stores are *subtracted*. The requirements of the unfilled apportionments must eventually be satisfied from material on hand, material on order, material to be ordered, or a combination of these.

The last section is the Available section. Under the title of this section on Form F appear the words "*That is: On Order and on Hand,*" which it is intended expresses in another way the balance available. Unfortunately this is a misleading expression for the reason that it is not even implied that the sum of these two balances must be unencumbered by any unfilled apportionments. A clearer definition would be the following:

> The balance available for apportionments is the difference between the sum of the quantity on order (not yet delivered) and the quantity on hand in the storerooms, less the apportioned but unfilled manufacturing or other orders.

The balance available on material forms of Class 1 is always the balance of material on hand in the storerooms, whereas the balances available on forms designed for apportionment are generally greater or less than the balance in the storeroom, and but seldom in agreement with it.

As a concrete example of this, a comparison may be made with respect to the information furnished by the entries on the material ledger sheets, Forms D and F, respectively. The information furnished as of Jan. 6, 1923, may be used on Form D. On that date the ledger showed 100 pieces of part number 7145 on hand in the storeroom. No material had been issued since the opening inventory on Jan. 1, 1923. Hence 100 pieces were available. Form F tells another story. Although the opening inventory was the same (100 pieces) there were apportionments made for two orders A-712 and A-715 to the amount of 10 pieces each on Jan. 1 and 5, respectively. As a result, although there were 100 pieces actually in the storeroom, only 80 pieces were available for future orders on Jan. 6; the other 20 pieces were reserved for the orders mentioned above. Thus it is seen that those two orders were reasonably protected so far as material supply was concerned.

Other distinguishing features with respect to the balance available concern themselves with increases and decreases of

that balance. Forms of Class 1 increase their balances available by means of actual receipts into stores, and decrease their balances by actual issues of materials. Not so with forms of Class 2. Their balances available are increased by *purchase orders placed* and decreased by *apportionments.*

Operating the Material Ledger Designed for Apportionments. With the exception of an occasional instance it will be found that generally there are 12 kinds of transactions which are reflected in the entries in the material ledger. These transactions with their resultant effects upon the four columnar sections, namely Ordered, On Hand, Apportioned, and Available are given in the following condensed form:

Transaction	Effect			
	Columnar section			
	Ordered	On hand	Apportioned	Available
1. Opening inventory	.....	Increase	.....	Increase
2. Recording purchase orders	Increase	.....	.....	Increase
3. Recording P. O. changes—increase in quantity	Increase	.....	.....	Increase
4. Recording P. O. changes—decrease in quantity	Decrease	.....	.....	Decrease
5. Recording receipt of material	Decrease	Increase	.....	.....
6. Recording apportionments	.....	.....	Increase	Decrease
7. Recording changes in apportionment—increases	.....	.....	Increase	Decrease
8. Recording changes in apportionments—decreases	.....	.....	Decrease	Increase
9. Recording issue of material from the storeroom	.....	Decrease	Decrease	.....
10. Recording return of material to storeroom from factory	.....	Increase	.....	Increase
11. Inventory adjustments—physical inventory less than ledger	.....	Decrease	.....	Decrease
12. Inventory adjustments—physical inventory more than ledger	.....	Increase	.....	Increase

Example of Application of the Above:
Transaction No. 5—Recording Receipt of Material.

The receipt of material decreases the amount of material outstanding on purchase orders as shown in the Ordered column, and at the same time increases the quantity in the storeroom shown by the column On Hand. Hence the decrease and increase to columns 1 and 2 respectively.

It is quite essential to the proper operation of this form that, after each transaction has been posted, new balances be brought down in the columns affected by the postings. The accuracy of these balances should, of course, be proved from time to time by use of the formula:

$$\text{Columns } 1 + 2 - 3 = 4$$

Transactions Entered on Form E.—The following chronological transactions entered on Form F are, with the exception of the necessary apportionments, identical with those transactions entered on Forms A, B, C, and D. This makes possible a comparison between all forms so far as arrangement of entries is concerned. The transactions which are the basis for entries on Form F are:

January 1, 1923:	Opening Inventory 100 pieces @ $2.50 ea.—$250.
January 1,	Apportioned on Order No. A-712 10 pieces.
January 5,	Apportioned on Order No. A-715 10 pieces.
January 7,	Withdrawn from stores on Requisition No. 1481 —10 pieces. Chargeable to Order No. A-712.
January 12,	Withdrawn from stores on Requisition No. 1512 —10 pieces. Chargeable to Order No. A-715.
January 17,	Apportioned on Order No. A-721 20 pieces.
January 18,	Withdrawn from stores on Requisition No. 1599—20 pieces. Chargeable to Order No. A-721.
January 18,	Purchase Requisition No. 7219 for 175 pieces forwarded to purchasing department.
January 19,	Purchase Order (copy) No. 5191 for 175 pieces received from purchasing department.
January 20,	Received from purchasing department Purchase Order Change applicable to P. O. 5191. Change 175 pieces ordered to 150 pieces.
January 22,	Apportioned on Order No. A-700 10 pieces.
January 22,	Apportioned on Order No. A-742 12 pieces.
January 24,	Withdrawn from stores on Requisition No. 1632 —15 pieces. Chargeable to Order No. A-730.
January 30,	Withdrawn from stores on Requisition No. 1695 —12 pieces. Chargeable to Order No. A-742.
January 31,	Returned to stores 2 pieces withdrawn on Requisition No. 1695. Credit Order No. A-742.
February 1,	Apportioned on Order No. A-751 10 pieces.
February 1,	Apportioned on Order No. A-764 10 pieces.

1. Apportioned on Order No. A-780 15 pieces.
1. Apportioned on Order No. 782 10 pieces.
4. Withdrawn from stores on Requisition No. 1789—10 pieces. Chargeable to Order No. A-751.
8. Withdrawn from stores on Requisition No. 1856—10 pieces. Chargeable to Order No. A-764.
10. Received notice of receipt of 150 pieces, ordered from the Acme Machine Company on P. O. No. 5191. Per unit cost—$2.40 each.
14. Withdrawn from stores on Requisition No. 1917—15 pieces. Chargeable to Order No. A-780.

Worked Material Ledger Form.—Although Form F is designed for the record of raw materials it is, with a few minor changes, adaptable as a record for worked material. So slight are these changes that the form itself need not be set forth in detail. The recommended changes, however, will be mentioned.

First, in the Ordered section the column Purchase Order Number is changed to read "Worked Material Order Number." Columnar sections On Hand, Apportioned, and Available, remain unchanged. The Location in Stores in the heading is changed to Location in Worked Material Stores, and the entire form is usually printed on a distinctive tinted paper or with a different colored ink which distinguishes it from the raw material form. In all other respects the worked material form is identical with Form F.

Application of Forms of Each Class.—Whether a form of Class 1 is more applicable to given conditions than a form of Class 2, or *vice versa*, depends upon several considerations, the most important of which is that of uniformity of rate of consumption. If the rate of consumption of material is not subject to violent variations from time to time, and if it is possible accurately to gage future requirements from past consumption, then forms of Class 1 will be found applicable. When it is considered, however, how seldom the above condition exists, the limited applicability of this class may be appreciated. Forms of Class 1 are for recording what has happened in the past, and except in so far as the records of the past may help in a very small degree, they are of little use for controlling future material requirements or movements.

Forms of Class 2, on the other hand, have every feature of forms of Class 1 and in addition, features which allow of actual material control. The one main advantage of forms of this

class is this: That once the requirements of the future manufacturing or other orders are known and apportionments recorded, the procedure which follows, automatically or nearly automatically, takes care, under a properly operated system, to control the situation so that material required is available at the right time. Forms of Class 1 do not allow for this record of future orders with the result that in all probability unless consumption is ideally constant, material for those orders will not be available when needed, simply because no opportunity has been given to plan deliveries ahead of time.

There is no question as to the applicability of Class 2 forms to practically every kind of business. Form F, although at first glance appearing to be too complicated for the average concern, is really simplicity itself when fully understood. Its advantages so outnumber forms of Class 1 that it has supplanted, and is supplanting, forms of the latter class to the great advancement of material control and with resultant benefits to all concerns who have adopted it.

One criticism against forms of Class 2 (of minor import to most concerns because the benefits derived far outweigh this fault) is the additional clerical expense incurred in operating the material ledgers. That more clerical work is required in the case of Form F than in the case of any one of the forms A, B, C, and D is easily seen from the following figures. Taking the quantities alone (omitting dates, dollars, etc.) the number of item postings appearing on each of the forms are:

Form A—12 item postings.
Form B—21 item postings.
Form C—27 item postings.
Form D—26 item postings.
Form F—82 item postings.

Thus it will be seen that from the standpoint of clerical cost Form F is by far the most costly to operate. When, however, it becomes a matter of controlling or not controlling material the extra expense required in the first instance will be repaid time and time again by the many benefits which accrue from a proper control system, not the least of which is the facility afforded for keeping the inventory down to a minimum investment. Only the very smallest of concerns can afford to give cost of operation consideration over everything else. Even

then it should not be a matter of cost of operation alone; it should be a matter of all costs compared with all benefits.

Types of Material Ledger.—At the present time there are but two types or styles of material ledgers in general use—the loose-leaf ledger, and the card ledger. Under the latter style would fall, so far as the present discussion is concerned: (*a*) such material records as are used both for originating and reporting the movements of material and at the same time for showing the balances of materials available and on hand; and (*b*) patented equipment for holding Material Ledger forms in such a manner that the name of each material on each form is visible at all times.

There is no question but that the card ledgers are slowly but surely supplanting the loose-leaf ledgers. Not that the loose-leaf ledger in all instances is inferior to the card ledger (for in many cases the former has, through experience, been found to be better suited to the needs of a peculiar condition than the latter) but because it (the loose-leaf ledger) has not the range of advantages possessed by the card ledger—especially card ledgers of patented design.

The ordinary or straight filing card ledger compared with the loose-leaf ledger has the following advantages:

1. It is more elastic.
2. It is more easily handled.
3. It is a quicker reference.
4. Each card is available individually.

Its disadvantages are:

1. Cards are more easily misplaced or lost.
2. More care is required from the standpoint of protection.
3. Greater chance of incorrect filing, with resulting annoyance the next time the card is wanted.

Concerning the advantages of one kind of ledger over the other, Henry H. Farquhar says:

Although loose cards of various sizes instead of sheets are frequently found in use, it is felt that in general the use of the latter is much safer and more satisfactory. The danger of misplacing a card where there are possibly thirty thousand items in a storeroom, each requiring at least one card, is very considerable and causes extreme annoyance when it occurs. Loose-leaf binders of this number of sheets, however, also have the disadvantage of taking up a great deal of room and of being either heavy or involving a great number of volumes. Some of the improved

card-filing devices remedy both of these defects quite satisfactorily, giving a maximum number of sheets or cards in a minimum space, making it impossible to misplace a card, and avoiding the lifting of heavy volumes since entries are made in position.

It is well to bear in mind, however, that in so far as ease in handling cards is concerned, it will be found that as the size of the cards increases, it will be more difficult to handle them rapidly. Hence where the information applicable to materials is extensive and therefore requires a large-size record, the loose-leaf ledger will be found to be better suited for the work than the card ledger.

Where card ledgers in any form are used, misplaced or lost cards will be reduced to a negligible number if the following instructions, taken from the standard practice manual of a prominent manufacturer, are strictly adhered to:

Under no condition, except as mentioned below, shall a material ledger clerk allow any of his balance of stores cards to leave the Material Records Department. In case of urgent necessity only, will the Purchasing Department be permitted to remove a balance of stores card from the Material Records Department and then only through the chief of the Material Records Department to whom shall be delivered two signed copies of Form 42 on which is acknowledged the receipt and the promise to return the card not later than 5 o'clock of the same day. One copy of Form 42 shall be given to the material ledger clerk, from whose records the borrowed card has been taken, and he shall notify his chief of all outstanding cards at 4:45 P.M. each day. *Under no circumstances shall a balance of stores cards be out of its department over night.*

Installing the Material Ledger.—The most important thing needed before material ledgers may be operated effectively is a complete and accurate physical inventory of all materials and supplies. While every physical inventory should be carefully accomplished, pains should be taken to see that the physical inventory to be used as the basis for commencing the use of the material ledgers is not only taken with the greatest of care but thoroughly checked. A *complete* inventory implies that nothing has been overlooked—that everything that should be included *has* been included. An *accurate* inventory implies not only accuracy in the quantities of materials but also accuracy in the description of materials.

Using this physical inventory as a means, the complete description of each kind of material, part, product, etc., should be

transcribed to the heading section of a material ledger form. Exactly what information is required in the heading section has already been set forth in preceding paragraphs. It is enough here to mention that the material should be so completely described that no chance is presented of confusing one item with another. The quantity should then be entered in the proper column, and if, in addition to quantity, it is intended that value be kept, this should also be transcribed from the opening physical inventory sheets to the material ledger form.

Minimum and Maximum Quantities.—Mention has previously been made to the matter of having the heading of each material ledger forms show the minimum and maximum quantities of

DATE

CONTROL SHEET OF MAXIMUM AND MINIMUM QUANTITY LIMITS

PART NO.	DESCRIPTION OF PART OR MATERIAL	PRESENT ACTUAL COUNT	PRESENT LIMITS		ACTUAL COUNT COMPARED WITH MAX. & MIN.		COST PER UNIT	RATE OF PRODUCTION ON WHICH PRESENT LIMITS WERE ESTABLISHED	PRESENT RATE OF PRODUCTION	RECOMMENDED INCREASE OR DECREASE TO MAX. OR MIN. LIMITS			
										MAXIMUM		MINIMUM	
			MAX.	MIN.	ACTUAL COUNT OVER MAX.	ACTUAL COUNT UNDER MIN.				INCR. TO	DECR. TO	INCR. TO	DECR. TO

FIG. 50.—Maximum and minimum quantity control sheet.

each material to be carried in stock. While it is quite common to find both the minimum and maximum quantities shown on the material ledgers of manufacturing concerns, it is not quite so common to find the quantities are what the names imply. In other words either the present limits have been incorrectly computed or the original figures, although once correctly computed, have never been adjusted to take care of changed conditions.

Theoretically, the minimum limit point of any material is that quantity which will be just sufficient to answer the requirements of, (*a*) production (in the instance of a manufacturing concern) or, (*b*) sales (in the case of a retail or wholesale concern) during the period of time required to replenish the supply. Theoretically, also, there should be no maximum limit since such a limit should coincide with the minimum limit. Because the above two factors—time to replenish, and consumption of

materials—are generally variable factors instead of constants, the minimum limit adopted in practice is always greater than the theoretical minimum limit, and the maximum limit exceeds the minimum limit. Unforseen and uncontrollable delays in replenishing supplies, and unforeseen increased demand for production or merchandise makes it necessary to establish, first of all, the theoretical minimum limit, and then to increase such limit by the use of a factor of safety to a quantity which anticipates conditions of the adverse kind.

Thus if it takes four weeks to replenish the supply of a certain part, and production requirements are 500 parts per week, the theoretical minimum limit will be 2,000. Applying a factor of safety of 25 per cent establishes the practical minimum limit to use as 2,500, provided the 25 per cent represents a factor of safety sufficiently great to cover requirements under ordinary conditions.

The establishment of a maximum limit presents a much more difficult set of conditions than in the case of a minimum limit. It is not uncommon to find in practice that maximum limits are either entirely omitted from the material ledgers or else based on guesswork. In some instances maximum limits are established not on the basis of requirements but by reason of lack of storage facilities. In other cases the maximum limit is fixed to prevent the purchasing of excessive quantities when the market may be favorable for purchasing, say, six months' or a year's supply at one time. One large automobile company sets up its maximum limits on certain supplies on the basis of average consumption over a period of three months. At best maximum limits are unsatisfactory and only in isolated cases are they of any benefit at all. The prevailing, but indefinite definition of what a maximum limit is, seems to be that it is "the greatest amount of material which should be carried at any one time."

It is sometimes asked in the matter of minimum limits just how one should know whether the limit for a certain material is too small or too large. To determine if the limit has been set at too low a figure, the balance on hand (or available, in the instance of apportionments) at the time of receipt of each new supply of material should be noted. Should such balances run pretty close to exhaustion, indications are that the minimum limit should be increased. If the quantity in stores (or available) is excessive, indications are that the minimum limit is too great.

In every case, however, no decision should be made until all pertinent factors have been fully considered. Minimum limits should always be used with caution, especially by the small concern whose business may fluctuate considerably.

Arrangement of Material Ledgers.—Separate material ledgers should be kept for each of the various classes of materials. For example, separate ledgers should be provided for the following:

1. Raw materials.
2. Finished parts.
3. Finished assemblies.
4. Finished product.
5. Operating and maintenance supplies.
6. Tools—perishable.
7. Unclassified stores.

If the variety of materials applicable to each kind or type of product is great enough, it may be advisable to maintain individual material ledgers for each of the various products. Where the variety of material is not great enough to warrant individual ledgers for each kind or type of product, the scheme of distinguishing the different material ledger forms applicable to the separate products in the same ledger by colors, is often resorted to with success. Thus in the raw material ledger the first 100 pages, printed on white paper, may be allotted to Model No. 1; the next 100 pages, printed on a buff-tinted paper, allotted to Model No. 2; the third 100 pages, printed on paper of a greenish tint, alloted to Model No. 3, etc.

The arrangement of the pages within each material ledger generally depends upon the kind of business the concern is engaged in. The material ledger forms may be arranged in any one, or in any combination, of the following ways:

1. Alphabetically.
2. Numerically.
3. Mnemonically.

Under the alphabetic arrangement of materials no index is required, such as may or may not be needed under the other two arrangements. Generally it will be found that raw materials are arranged alphabetically; finished parts, assemblies, and products, numerically; and operating and maintenance supplies, alphabetically. Sometimes supplies of the latter class are arranged mnemonically in the ledgers.

Whatever the arrangement best suited to the concern may be, means should be taken so to serial number each page (or card) in such a way that misplaced sheets or cards will be easily noticed.

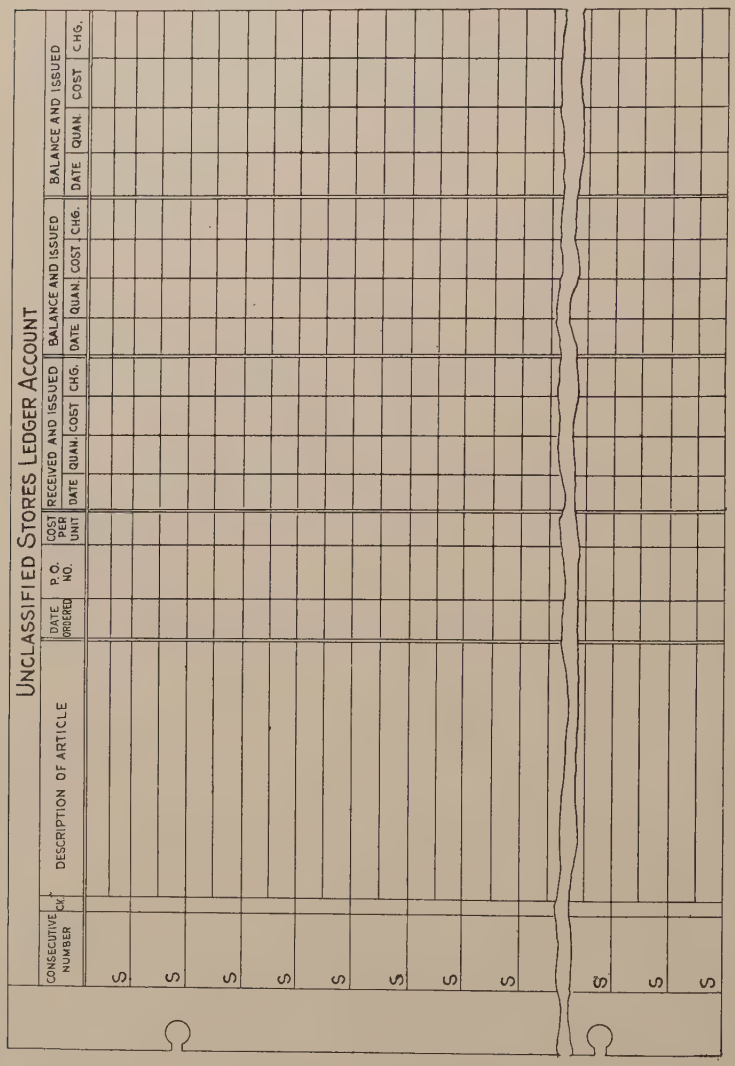


FIG. 51.—Unclassified stores ledger account form.

One thing to keep in mind in planning the arrangement of material ledger pages or cards in the ledgers themselves is this—that those pages or cards most in demand should, as nearly as

possible, be arranged by themselves, either in separate ledgers or in separate divisions of one ledger. Ledgers should always be arranged to permit one to locate each individual material sheet in the shortest time possible or otherwise additional ledgers and ledger clerks will be required to handle a given volume of work.

Location of Material Ledgers.—The majority of the larger concerns, since they use their material records for many purposes, generally locate their material ledgers either in, or close by, the Production Department, assigning to the section charged with operating the ledgers the name "Material Control Department" or some such descriptive title. If the material ledgers are so located, no stock records need be kept in the storerooms although it is customary to have in each storeroom a card index of some sort which shows the exact storage location of each part and kind of material.

In small concerns, however, it is a common thing to find that the material ledgers are not only located in the storeroom but also are operated by the strekeeper or his clerk. From the standpoint of economy, so far as clerical expense is concerned, this arrangement is usually satisfactory. It has, however, several disadvantages. In the first place it allows the one who is charged with material accountability to operate his own material ledgers; in the second place this arrangement makes the material ledgers practically useless for any purpose save that of furnishing a record of what material came in, what went out, and the balance on hand. Only in those concerns where the expense of operating the material records is the determining factor does this procedure justify itself, and then in most cases it is a question, for placing such clerical work on a storekeeper usually results in one kind of work being done at the expense of the other.

Sometimes it is difficult to decide where the material ledgers should be operated. Determining, first, exactly what information will be required from the ledgers and what department will make most use of them, and second, the probable volume of work (in order to gage the number of employees required) should help in making the decision. Although the advantages of not having the material ledgers in the storeroom and not operated nor supervised by the storekeeper are quire evident, many small concerns will not, or cannot, stand the extra clerical expense required.

Wherever possible, material records should be consolidated in one department. Keeping such records in more than one place, unless absolutely necessary, may result not only in duplicating work but in making the expense of maintaining the records much greater then it should be.

Operating the Material Ledgers.—Up to this point there has been discussed the design, form, arrangement, location, and installation of the material ledger—the most important material record and the pivotal point of a material control system. It is now proposed to develop the details of material control and to show through the operation of the material ledger exactly how all movements of material, reported through the medium of properly designed forms, are recorded in such a way as to present a continuous picture of each item of material.

As the success of any endeavor is chiefly dependent upon the human element, it is essential first of all, with respect to the material control department, that those employees who operate the ledgers should know at all times what they are doing, why they are doing it, and how to do it. Second, the material ledgers must be kept accurate and up-to-date. Third, each clerk should be responsible for the ledgers which are assigned to him. Where work in the material control department runs to any volume, certain clerks may be assigned to operate the raw material ledgers, other clerks the finished parts ledgers, others the operating and maintenance supplies ledgers, and so on. Wherever possible, this department should be so organized as to allow each employee to perform but one kind of work instead of a great variety. This results in better and more careful work, and makes the training of new employees easier.

One thing above all others to be impressed upon those entrusted with the operation of the ledgers is the following rule taken from the procedures of a prominent concern:

> No entry shall be made in a material ledger unless the basis for the entry is a company form, properly used and signed by the person or persons with authority to do so. Under no circumstances shall the basis for an entry be oral instructions.

If these instructions are strictly carried out every entry, whether it be a record of materials received, materials issued, material returned, or adjustments, will be supported by documentary

evidence. Nothing perhaps causes the collapse of a material control system quicker than permitting unauthorized and unsupported entries to be made in the material ledgers.

The following chapters treat of the operations of ordering, purchasing, receiving, storing, etc. and their documentary relations with the material ledger.

CHAPTER XVIII

ORDERING, PURCHASING, AND RECEIVING

ORDERING

A Material Control System, deserving of such a name, requires that all requests for the replenishment of materials either originate from the Material Control Department or, if originating in another department then pass over the material ledgers before any purchases are made. If proper minimum stock limits have been established and if the ledgers are both properly and correctly operated, information when to replenish should in most cases be easily obtainable from each material ledger sheet. Whenever the quantity of a material falls to the minimum limit point, information is thus afforded the clerk by means of which he can set into action such procedures as will result in the depleted stock being replenished with new material.

The minimum limit point, or the point at which steps should be taken to obtain additional material, may be either one or the other of the following two quantities depending upon the type of material ledger form being used;

1. The actual quantity of material on hand in the storerooms.
2. The quantity of material *available* for future orders.

Where the ledger form has been designed without consideration for apportionments, the minimum limit is the *actual* quantity of material on hand in the storerooms, or (1) above; where the ledger form *is* designed for apportionments, the minimum limit is the quantity *available,* or (2) above.

In every instance, however, it will not be possible for the ledger clerks to originate the Purchase Requisitions. Especially is this so when new material for new parts or new products—materials not already stock articles—are being purchased for the first time. Only the planning or production department in such cases can originate such Purchase Requisitions since they are the only ones to know exactly what kinds and quantities of materials are required for the new parts or products.

Requisitions for the purchase of what are commonly known as "unclassified stores" also originate at places other than the

material ledgers. "Unclassified stores" is the name given collectively to those material or equipment items, the purchase of which happens so seldom and in such quantities as to make the keeping of a separate account in the material ledgers unnecessary. Special repair parts for equipment, office equipment such as chairs, tables, typewriters, etc., factory equipment such as dies, jigs, fixtures, etc., and machinery, are examples of what may be considered as items of unclassified stores. Under ordinary conditions no inventory of these items is kept in stores, for they are usually ordered only as, and when, urgently required.

Although in these two cases—the purchase of materials for the first time, and the purchase of unclassified stores—the requisitions for purchases originate other than at the material ledgers, they should *always* be forwarded to the Material Control Department and recorded there before reaching the Purchasing Department. Three copies of the Purchase Requisition will be needed in instances of the above; one copy for the department in which the requisition is written, one copy for the ledger clerk in the Material Control Department, and the original for the Purchasing Department.

With the exception of the two cases just mentioned, the responsibility of the ledger clerk in noting when the minimum limit has been reached, and then requesting replenishment, in all his. Should, by chance, it so happen that he fails to observe when a material has reached its low limit, the resultant effect may be quite serious. In order to make it doubly sure that new material is ordered at the right time, it is customary, in concerns where material control is well established, for the storekeeper to watch his bin-tag quantities carefully, and when a quantity reaches the storeroom minimum limit to send the bin tag to the material ledgers. Before doing so, however, the storekeeper replaces the regular bin tag with a temporary bin tag which remains in the bin-tag holder until the quantity in the bin *exceeds* the minimum limit.

The ledger clerk's means of requesting replenishment of material is the Purchase Requisition, a form which is not only a notification to the Purchasing Department that a certain quantity of a certain kind of material is needed, but also a means of furnishing the Purchasing Department with all such information as will permit that department to commence and consumate the operation of purchasing with the least expenditure of time. Purchase

Requisitions should be made out by the ledger clerks in duplicate at least. The original copy goes to the Purchasing Department while the duplicate is held by the ledger clerk as a tickler until a copy of the Purchase Order is received from the Purchasing Department. Should the latter department fail to place a Purchase Order within a specified time it should be the duty of the ledger clerk to advise his chief of the delinquency.

PURCHASE REQUISITION

DATE	FOR STOREROOM	SERIAL NO.
Jan. 18, 1923	#5 – A5 B2	7219

MATERIAL SHOULD BE IN PLANT BY	PURCHASING AGENT:
Feb. 8, 1923	YOU ARE REQUESTED TO PLACE A PURCHASE ORDER FOR THE FOLLOWING MATERIAL AT ONCE (OR ON _____)

DRAWING NO.	SPECIF. NO.	DESCRIPTION	QUAN. TO ORDER	LAST PURCHASE DATA		
				BOUGHT FROM	QUAN.	PRICE
7145	17	Side Arm Bracket #7145 Brass – Semi Fin.	175	Acme Mach. Co.	150	2.50
				PURCH. ORDER	DATE	
				#4215	11/20/22	
S						

THE BASIS FOR THIS PURCHASE REQUEST IS AS FOLLOWS:

MIN. LIMIT	STOCK LEDGER NOW SHOWS	BIN TAG NOW SHOWS	BAL. AVAILABLE AFTER LAST APPORTIONMENT	EST. TIME TO GET MATERIAL IN	TIME REQUIRED TO GET LAST MATERIAL IN
60	60	—	60	20 days	18 days

MATERIAL LEDGER NO.	DOES THIS REQUISITION REQUIRE SIGNATURE OF G.M.		SIGNED		
45				A.B. Jackson — MATERIAL LEDGER CLERK	
P.O. NUMBER	YES	NO.		J. Murphy — SUPT. OF MATERIALS	
5191		✓		— GEN. MGR.	DATE —

FIG. 52.—Purchase requisition.

A form of Purchase Requisition is shown above. A few features of this form are worthy of attention. First of all it is to be noted that the exact location where the material is to be stored is given. This information, noted by the Purchasing Department, should be placed upon all Purchase Orders so that when the material arrives and is inspected it may be dispatched at once by the Receiving Department to the proper storeroom and placed in the correct bin by the storekeeper. The next matter to be noted is the space allowed for the signatures of each person required to

sign. The ledger clerk and his chief should always sign, and in special cases where the quantity or value exceeds a certain figure the general manager signs. It will be seen from the form furnished here that the Purchasing Department is supplied not only with a detailed description of the material, but also data with respect to the prior purchase of the same kind of material and the basis for making the request for purchase. The information filled out on this form should be carefully compared with the material ledger sheet on page 347 and the Purchase Order on page 368. In fact, all forms used here in illustration will be found related to the material ledger sheet on page 347, *i.e.*, information on each form will be found posted to the material ledger sheet referred to above.

All the material called for on a Purchase Requisition may be needed just as soon as possible, or it may be required in accordance with a predetermined schedule of deliveries. If a large quantity of material of a certain kind is needed, but is to be scheduled to be received as of certain dates, the Purchase Requisition should show the dates and the quantity of material required on each date. Such a schedule is generally placed on the reverse side of the Purchase Requisitions. Its form would be as follows:

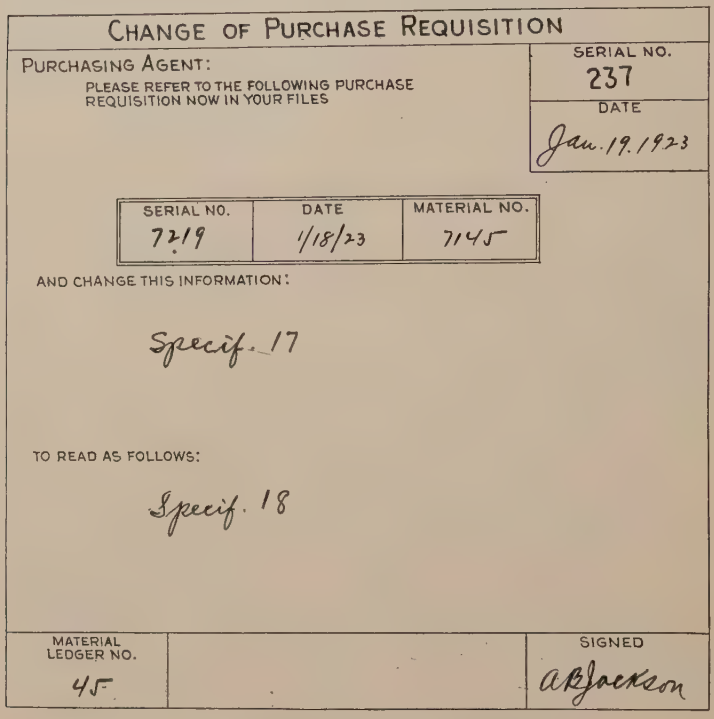
Date required	Quantity required
Jan. 5	100
Jan. 15	100
Jan. 25	100
Feb. 4	100
Feb. 14	100
Feb. 24	100
Mar. 5	100
Mar. 15	100

The number of the material ledger which contains the account of the material to be purchased is placed in the lower left-hand corner of the form by the ledger clerk so that the Purchasing Department may put this information on the Purchase Order. Thus a copy of the Purchase Order, and later a copy of the receiving notice, will reach the proper ledger which contains the account of the material being purchased.

All Material Control Department copies of the Purchase Requisitions are held in a tickler file in that department until

copies of Purchase Orders, applicable to these requisitions, are received.

Between the time that a Purchase Requisition is forwarded to the Purchasing Department and the placing of the Purchase Order it happens from time to time that the person who origi-



CHANGE OF PURCHASE REQUISITION

PURCHASING AGENT:
PLEASE REFER TO THE FOLLOWING PURCHASE REQUISITION NOW IN YOUR FILES

SERIAL NO. 237

DATE Jan. 19, 1923

SERIAL NO.	DATE	MATERIAL NO.
7219	1/18/23	7145

AND CHANGE THIS INFORMATION:

Specif. 17

TO READ AS FOLLOWS:

Specif. 18

MATERIAL LEDGER NO.		SIGNED
45		A R Jackson

FIG. 53.—Change of purchase requisition.

nated the Purchase Requisition discovers an error or omission on this form. As a result, the Purchasing Department should be notified of the change or changes to be made. This is accomplished by use of the form known as the Change of Purchase Requisition. Two copies of this form are made out by the material ledger clerk—the original for the Purchasing Department and the copy for his own files.

PURCHASING

With the possible exception of one or two very unusual instances, all requests made of the Purchasing Department for the purchase of materials should be in the form of Purchase

Requisitions which have been properly signed. The Purchasing Department considers a properly signed requisition as its official authorization for requesting and securing bids, and placing orders with its various vendors. Acting on an oral request for material, with the promise of a requisition to follow, is an unsafe practice to follow, for it usually causes serious embarrassment to the Purchasing Department. Especially when the promised Purchase Requisition never puts in appearance.

With the signed Purchase Requisition as the basis for its action, the Purchasing Department proceeds to determine which one of the many vendors should be the one selected to furnish the required material. Of the many details which the Purchasing Department must take into consideration before placing an order, the following are the most important:

1. Price.
2. Quality.
3. Suitability.
4. Delivery date.

Without giving consideration to the many technical matters which make up the greater part of the business of purchasng it may now be assumed that the most suitable vendor has been singled out and is to be notified of such selection. The Purchasing Department notifies such vendor by means of the Purchasing Order—a document which when accepted by the vendor becomes a contract between the respective parties to the transaction.

At least six copies of each Purchase Order are usually made out under a system of material control. These copies are distributed as follows:

1. Original—to vendor.
2. First copy—to material ledger.
3. Second copy—to Auditing Department.
4. Third copy—to Receiving Department.
5. Fourth copy—Purchasing Department copy.
6. Fifth copy—Purchasing Department follow-up.

As previously mentioned, all Purchase Orders should show the storeroom number and the location in that storeroom to which the material must be delivered. This information is obtained from the Purchase Requisitions. In addition, each Purchase

Order should give the number of the material ledger in which the account of the material being purchased is located.

Copies of all Purchase Orders are forwarded to the Material Control Department where upon their arrival the following operations are then performed:

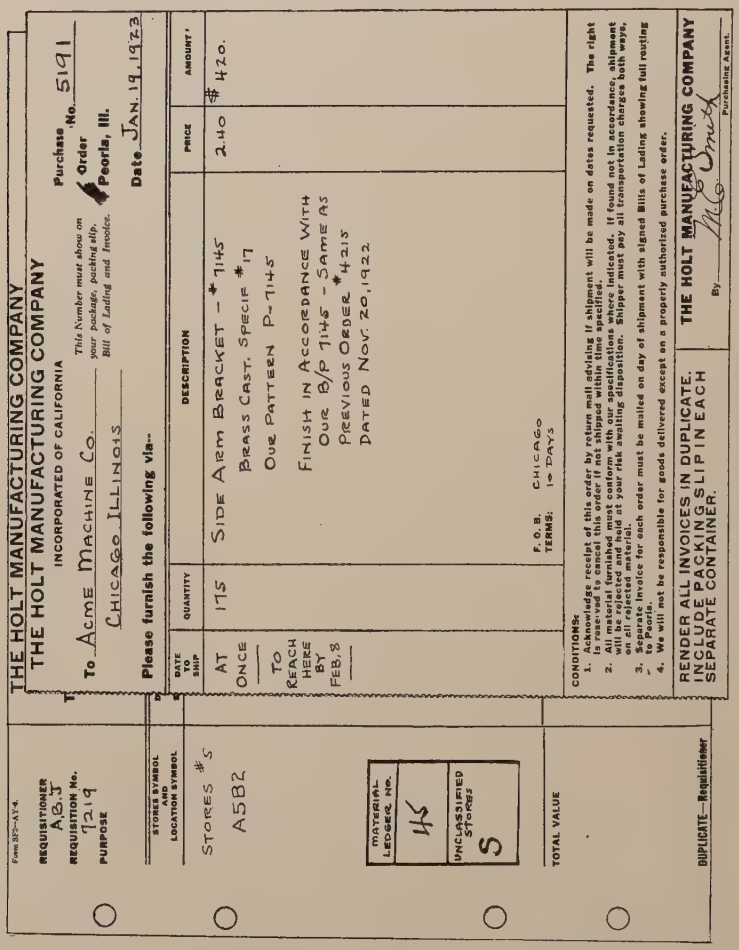

THE HOLT MANUFACTURING COMPANY
THE HOLT MANUFACTURING COMPANY
INCORPORATED OF CALIFORNIA
Purchase No. 5191
Order
Peoria, Ill.
Date JAN. 19, 1923
To Acme Machine Co.
Chicago Illinois
This Number must show on your package, packing slip, Bill of Lading and Invoice.
Please furnish the following via--
REQUISITIONER A.B.J.
REQUISITION No. 7219
PURPOSE
STORES SYMBOL AND LOCATION SYMBOL
STORES #5 A582
DATE TO SHIP
AT ONCE — TO REACH HERE BY FEB. 8
QUANTITY
175
DESCRIPTION
SIDE ARM BRACKET - #7145
BRASS CAST. SPECIF #17
OUR PATTERN P-7145
FINISH IN ACCORDANCE WITH OUR B/P 7145 - SAME AS PREVIOUS ORDER #4215 DATED NOV. 20, 1922
PRICE
2.40
AMOUNT
$420.
MATERIAL LEDGER NO.
45
UNCLASSIFIED STORES
S
F.O.B. CHICAGO
TERMS: 10 DAYS
TOTAL VALUE
CONDITIONS:
1. Acknowledge receipt of this order by return mail advising if shipment will be made on dates requested. The right is reserved to cancel this order if not shipped within time specified.
2. All material furnished must conform with our specifications where indicated. If found not in accordance, shipment will be rejected and held at your risk awaiting disposition. Shipper must pay all transportation charges both ways, on all rejected material.
3. Separate invoice for each order must be mailed on day of shipment with signed Bills of Lading showing full routing to Peoria.
4. We will not be responsible for goods delivered except on a properly authorized purchase order.
RENDER ALL INVOICES IN DUPLICATE. INCLUDE PACKING SLIP IN EACH SEPARATE CONTAINER.
THE HOLT MANUFACTURING COMPANY
By
Purchasing Agent.
DUPLICATE—Requisitioner

Fig. 54.—Purchase order.

1. Purchase Orders are sorted according to the various material ledgers. This is readily accomplished by means of the ledger number appearing on each Purchase Order.

2. All Purchase Orders applicable to each ledger are sorted and arranged in the order of Purchase Requisition number.

3. Each clerk takes those Purchase Orders applicable to his ledgers, draws out the Purchase Requisitions, compares the information on each with its respective Purchase Order, and attaches the requisition to the Purchase Order. If there are any discrepancies he notifies the Purchasing Department and this department corrects the error by means of a form called Change of Purchase Order.

4. From the copies of the Purchase Orders the following information is posted to the Ordered column of the respective material ledger sheets·

a. Purchase Order date.
b. Purchase Order number.
c. Purchase Order quantity.

If the ledger sheet is for apportionments, the same information is also placed in the Available column (see Form F, page 347). The purchase order quantity increases the quantity *available.* In the figure on page 347 it will be noted that the Available column shows a Purchase Requisition number (7219) instead of a Purchase Order number (5191). The Purchase Requisition number is usually written in this column in pencil, later erased, and the Purchase Order number substituted in ink.

CHANGE OF PURCHASE ORDER

DATE	NOTES	NET PRICE PER	AMOUNT
Jan. 20/23			
PURCH. ORDER NO. 5191	Present Purchase Order		
	175 Side Arm Brackets #7145	2.40	$ 420
REQ. NO. 7219			
REQUISITIONER Jackson	Change to		
	150 Side Arm Brackets #7145	2.40	360
TOTAL VALUE $360			ENTERED a/kj.

MATERIAL LEDGER COPY

FIG. 55.—Change of purchase order.

5. After all postings have been made from the copies of the Purchase Order these copies, with their Purchase Requisitions attached, are filed either by Purchase Order number or by vendors' names until the materials arrive.

Occasionally it happens that for one reason or another a Purchase Order needs to be changed after it has been written, and the various copies distributed. The unit price may be

incorrect; the quantity may be too great or too small, and hence must be adjusted; the description may be wrong. Whatever the cause may be, it is necessary that those who receive copies of the Purchase Orders be advised. All such changes are made on a form known as the Change of Purchase Order.

Copies of this form made out in the purchasing department, reach the material ledgers where, after all necessary adjustments are made to the "Material" accounts, they are attached to the Purchase Orders and Purchase Requisitions to which they apply.

RECEIVING

Up to this point methods and procedures in connection with both purchase requisitioning and purchasing have been discussed, especially with respect to their relations with the pivotal material control record—the material ledger. The next step which logically follows in the cycle of material movement is the receipt of material from the vendor from whom it has been ordered. The following paragraphs, therefore, take up and explain the necessary paper work required to reflect at all times transactions involving the receipt of materials from outside sources. But before describing the various receiving records and their uses it may be well to trace briefly some features connected with the actual receiving of material itself.

Concerning the receiving of material Wilfred G. Astle says:

> Material, under no circumstances, should be received through any channel except the Receiving Department. Any other course will surely lead to endless mistakes and trouble. This department is usually one in name only. The reason for this is that it is customary to have the receiving and shipping done by the Shipping Department, in all except the larger organizations. When this method is used, the Shipping Department simply makes out a Receiving Report in duplicate, showing the number of boxes, barrels, or crates received.
>
> The duplicate copy of this report should be retained by the Shipping Department and filed according to the date the material is received. If preferable, they can be filed alphabetically according to the name of the concern from whom the material was received. This routine will insure in all cases a correct record of receipt. The original copy is sent to the proper storeroom or department, attached to the material. Under this arrangement the material is not opened in the Shipping Department. The receipt is merely evidenced by the making out by the clerk of a Receiving Report.

This plan as outlined has three excellent features. Inasmuch as all material would necessarily have to be verified after reaching the storeroom, by counting and checking, the same operation in the Receiving Department amounts to an exact duplication of work. It would also mean the incident additional cost of labor involved. This is one thing that should always be avoided. The opening of the material in the Shipping Department would require additional floor space and benches, which is duplicated in the storeroom. Material if opened in the Shipping Department is more liable to be stolen in transit to the storeroom, or possibly lost.

Nevertheless, there is one particular advantage gained by maintaining a regular Receiving Department where materials are inspected, counted, and weighed, as soon as received. It furnishes an additional check on receipts which in cases of disputes with outside concerns as to amounts delivered, furnishes the most reliable evidence that reasonably can be obtained. This plan also satisfies the management that materials received are being properly accounted for by two distinct departments. Much can be said for the double check, when its cost of maintenance is not out of all proportion to its value.

Whether materials are received by a separate Receiving Department or by the storekeeper is generally dependent upon the size of the concern. While this does not hold true in every case, yet in the greater majority of instances it will be found that large plants receive through a separate Receiving Department and small plants through the storekeeper. Whether one or the other means of receiving is used, no material should be accepted unless there is a Purchase Order copy to check against, and no material in excess of the Purchase Order quantity should be taken into stores unless written authority to do so has been given by the Purchasing Department. Whether or not the storekeeper is charged with the duties of receiving, he should always count, weigh, or measure all material before accepting it for stores, for otherwise he may later be held accountable for something he never received.

Information for the Receiving Department.—Up to the time that a vendor of material delivers it directly to the Receiving Department, or notice is received from a common carrier that the material has arrived and is available, the only information that the Receiving Department possesses concerning the purchase of such material is obtained from the copy of the Purchase Order.

As previously explained six copies of each Purchase Order are made. The third copy is the Receiving Department's copy.

In some few cases it will be found that this copy is a "short" copy *i.e.*, that no quantities are to be found thereon. The theory back of this idea is to require the Receiving Department to make a check absolutely independent of any given information. Most concerns, however, furnish their Receiving Department with a complete copy of the Purchase Order. This latter method has been proved more satisfactory than the first method, for it saves a great deal of time and annoyance not only to the Receiving but also to other departments.

Copies of Purchase Orders forwarded to the Receiving Department may be filed either alphabetically by the vendor's names, or by Purchase Order numbers. All copies of Purchase Orders are thus kept until the materials, to which they apply, arrive.

Arrival of Material.—Upon receipt of material, the receiving clerk goes to his file of open Purchase Orders and pulls out the Purchase Order to which the material applies. With this document he proceeds to check the material. Checking material requires, in addition to counting, weighing, or measuring, the inspection as to condition and quality. In many cases this last feature is performed by the physical or chemical laboratories. The purpose of checking is to see that the concern is getting the quantity, kind, and quality of material for which payment has been, or will be, made.

After the material has been checked in, all information pertaining thereto is then filled in on a form known by various names—Receiving Report, Receiving Sheet, Record of Goods Received, Receiving Ticket, Receiving Slip, and Notification of Material Received. An illustration of a receiving form will be found on page 373. Whatever name the form goes under, its purpose in all instances is the same, *i.e.*, a complete history of the receipt of material to be used as a means for auditing the purchase invoice, for completing the purchase records, and for posting to the material ledgers.

If possible, all material received from outside concerns should be moved into stores first and, when required, issued out on requisition. In certain special cases, however, such a procedure would only be a useless waste of time and money. Especially is this so where the item is some large piece of equipment for immediate use. The Receiving Department, when special cases like these arise, makes delivery direct to the place where the

material is required, and not to stores. However, all paper work, as subsequently explained, must be accomplished in the same manner as though the material did actually enter stores and was requisitioned out therefrom.

NOTIFICATION OF MATERIAL RECEIVED

DATE	PURCH. ORDER NO.	PURCH. REQ. NO.	SERIAL NO.
Feb. 10/23	5191	7219	375

RECEIVED FROM	ADDRESS
Acme Machine Co.	Chicago, Ill.

VIA	CAR NO.	PACKAGE NO.	FRT. BILL NO.	TRANS. CHARGE
Rock Isld.	37215 NYC	72	6524	—

ITEM	DESCRIPTION	SIZE	UNIT	QUAN. ACCEPT.	QUAN. REJECT.	REMARKS
1	Side Arm Bracket	3	Pc.	150	—	
2	#7145					
3	Spec. 17					
4						
5						
6						
7					SHIPPERS WGT.	UNCLASSIFIED STORES
8						S
9					OUR WEIGHT	MATERIAL LEDGER NUMBER
10						45

STORAGE LOCATION	RECEIVED INTO STORES	
SEND TO	DATE	STOREKEEPER
15-A5 B2	2/10/23	M. Gilboue

E. J. Mack
RECEIVING CLERK

DEPARTMENT	DATE ENTERED	ENTERED BY
PURCHASING		
INVOICE AUDIT		
MATERIAL CONTROL	2/11/23	ABJ.

IF MORE THAN TEN ITEMS TO SHIPMENT RECEIVED USE OTHER SIDE OF THIS FORM.

COPY FOR MATERIAL LEDGERS

FIG. 56.—Notification of material received.

Purchase Invoice.—Most purchase invoices are received before the receipt of the material. On the other hand, in the case of local purchases and occasionally in the instance of out-of-town purchases, materials arrive ahead of the invoice. Thus two files are required in the Purchasing Department—one file for invoices awaiting receiving notifications, and the second, for

receiving notifications awaiting receipt of their respective invoices.

Usually all purchase invoices are filed in the Purchasing Department until the materials arrive. But prior to their filing each invoice is time-stamped and a serial number for future identification and control purposes usually affixed. The Purchasing Department also applies a stamp on the back of each invoice for the purpose of subsequent audit. This stamp also gives the various departments spaces for checking and approving the particular invoice when such a procedure is required.

Many invoices allow a cash discount to be taken provided payment is made by a stated number of days after the data of the invoice. As most concerns desire to avail themselves of all cash discounts, it is important that invoices allowing cash discounts be given preference at all times. Such invoices are immediately identified by stamping them prominently with information concerning the latest possible payment date and the cash discount rate. These invoices are then filed. When materials applicable to such invoices arrive and notifications of arrival are received by the Purchasing Department, these invoices with their supporting papers should be audited and forwarded immediately to the Accounting Department for vouchering and payment. As a matter of business courtesy many companies give first preference to the invoices of concerns who are in the hands of receivers, and make settlement with all possible dispatch.

Quite often materials are delayed in transit to such an extent that cash discounts cannot be taken unless payment is made before the receipt of the material. If purchases have been made from reputable concerns such payments are effected and any differences which may arise in checking the materials, adjusted later. When payments are made in this manner the Purchasing Department should make proper notations on its records and forward the invoices through the Invoice Audit Department, to the Accounting Department for vouchering and payment. Before forwarding these invoices the Purchasing Department should stamp both on the invoice and the Purchase Order a notation similar to the following: *Goods not Received—Cash discount to be Taken.* After payment, these invoices should then be returned to the Purchasing Department where a record of such payment is made as a precaution against duplicate payments

MONTH	DAY	YEAR

Notification Slip for Productive Material No. 5801 A

TRAFFIC PAGE_____

ON PURCHASE ORDER NO. P_____ I HAVE RECEIVED _____BOXES _____CRATES _____BARRELS _____PACKAGES, CONTAINING THE FOLLOWING ITEMS, WHICH WEIGH_____POUNDS. I HAVE TIED INSPECTION TAGS ON SAME. THESE ITEMS (DO) (DO NOT) CLOSE THE ORDER.

_____

_____

_____

SIGNED_____
STOREKEEPER, OR HIS REPRESENTATIVE

I HAVE INSPECTED THE ABOVE MATERIAL. THE ACCEPTED QUANTITY HAS BEEN TAGGED WITH A STORES TAG, WHICH HAS BEEN SIGNED BY ME.

REJECTED_____
ACCEPTED_____

REASON FOR REJECTION:_____

_____

_____

_____

_____

MONTH	DAY	YEAR

SIGNED_____
INSPECTOR

I HAVE ENTERED THE ACCEPTED QUANTITY ON BALANCE SHEET,
INCLUDING THE PRICE - - - - $_____
AS TAKEN FROM THE PURCHASE ORDER,
PLUS THE FREIGHT / EXPRESS CHARGE OF - - $_____
AS TAKEN FROM NOTIFICATION SLIP,
MAKING THE TOTAL PRICE OF - - $_____

BALANCE OF STOR'S CLERK	PURCH. AGENT	AUDITOR

SIGNED_____
BALANCE OF STORES CLERK

FIG. 57.—Notification slip for productive material (original).

—an occurrence which is not uncommon in some concerns. The record of the payment should be made on the copy of the Purchase Order.

All invoices which do not bear the special discount stamp, are held by the Purchasing Department in its file until the receipt and acceptance of the material is evidenced by a Notification of Material Received, properly signed by the Receiving Department.

Purchasing Department Record.—Once or perhaps twice a day the Receiving Department forwards a copy of each notification of receipt of material to the Purchasing Department where the respective Purchase Orders to which the notifications apply are referred to. It should be borne in mind that the receipt of material applicable to different Purchase Orders should be reported on separate notification forms.

Whether the receipt of material represents a complete or only partial delivery, it is necessary for the Purchasing Department to record each receipt on its copy of the Purchase Order. This is principally for the purpose of keeping a record of deliveries and balances still due and, as stated previously, to prevent duplication of payments.

First, let it be assumed that the material received is a complete delivery. In this case the Purchase Order in the Purchasing Department is posted from the notification of receipt after a comparison is first made of its description, number, etc. All documents[1]—the invoice, notification of material received, and any correspondence pertaining thereto—are then pulled from the file and sent to the Invoice Audit Department (a department

[1] When the operation of invoice auditing is performed by the Purchasing Department that department is supplied with two copies of the Purchase Order. These copies are used as follows:

1. For purchase follow up.
2. For record of deliveries and for auditing purposes. (Some concerns have an extra copy for their correspondence files.)

When the operation of invoice auditing is *not* performed by the Purchasing Department, that department still demands the two copies:

1. For purchase follow up.
2. For record of deliveries.

However, an additional copy of the Purchase Order must be supplied to the Invoice Audit Department. There they are filed in Purchase Order number. Many times, especially in small concerns, such auditing is done in the Purchasing Department itself.

quite commonly found in the larger concerns) or to the Auditing or Accounting Departments if these departments are charged with the duty of invoice auditing.

If an invoice, and the material applicable thereto, represents only a part and not the whole of the quantity ordered, such information is recorded on the Purchase Order in the Purchasing Department and the balance due brought down. It is imperative that the Purchasing Department have a complete record of each partial delivery and payment thereof. After a record of the partial delivery has been made, a special form, known as a Partial Delivery form, is filled in by the Purchasing Department with information concerning the Purchase Order number, vendor, quantity, price, terms, etc. This form properly signed is also acknowledgment that a notation concerning partial delivery has been made on the Purchasing Department's copy of the Purchase Order. The invoice, notification of material received, and the Partial Delivery form, then go forward to the invoice audit Department.

Whenever the full amount of the material ordered is received, and the final invoice passed through, the Purchase Order is taken from the unfilled Purchase Order file and placed in the filled Purchase Order file. The same should be done in the case of orders that are canceled.

Invoice Auditing.—The purpose of auditing invoices is three-fold:

1. To determine, before payment is made, if all charges made by the vendor on his invoice are correct and in accordance with the terms of the purchase contract (the Purchase Order).
2. To prevent duplicate payment of the same charge.
3. To inform the proper departments of adjustments due from, or to, the vendor.

First of all the Invoice Audit Department must be supplied with all information pertaining to the purchase and the completion thereof. This means that copies of the following documents must be furnished:

1. Purchase Order.
2. Purchase Order Changes.
3. Notification of Material Received.
4. Partial Delivery Notices.

With these documents available, the Invoice Audit Department is in a position to pass on the correctness of vendor's invoice. The operations of audit are as follows:

1. Verify Purchase Order number.
2. Verify vendor's name.
3. Check material description.
4. Check quantity with notification of material received.
5. Check prices with Purchase Order.
6. Check extensions.
7. Verify all trade discounts and calculations thereof.
8. Check sub-additions.
9. Check grand total.
10. Check purchase terms.
11. Check transportation terms.

THE PARAFFINE COMPANIES, INC.

GENERAL OFFICES:
34-40 FIRST STREET
SAN FRANCISCO, U.S.A.

June 15 1924

To The Standard Corporation
525 Market Street,
San Francisco, Calif.

WE ARE RETURNING HEREWITH YOUR INVOICE, WHICH WE CANNOT PASS FOR PAYMENT FOR REASON AS CHECKED BELOW:

KINDLY ADVISE YOUR CREDIT DEPARTMENT THAT THE DISCOUNT DATE WILL OF COURSE BE COMPUTED FROM DATE INVOICE IS RETURNED TO US CORRECTED.

YOUR PROMPT ATTENTION TO THIS WILL EXPEDITE PAYMENT.

OUR ORDER NUMBER NOT SHOWN	☒
ORDER NUMBER SHOWN INCORRECTLY	☐
F.O.B. POINT NOT GIVEN	☐
PRICE NOT AS QUOTED	☐
INVOICE NOT ON OUR REGULAR FORMS (SET HEREWITH ATTACHED)	☒
ERROR IN EXTENSION	☐
_____	
_____	☐

PURCHASE DEPT.

FIG. 58.—Form to accompany returned vendor's invoice.

Invoices found to be correct are stamped with an audit stamp and forwarded with the notifications of material received to the Accounting Department for vouchering and payment. At the same time information concerning the approval of invoice is noted on the auditing copy of the Purchase Order. The latter document is then stamped and transferred out of the file of active Purchase Orders to the completed Purchase Order file.

When an invoice must be paid before the material is received, in order that the cash discount may be taken, the audit of the invoice is similar to the one described above except that it must be assumed that the quantity, kind, and quality of the material to be received will not vary from the Purchase Order specifications. As explained previously, when an invoice is paid before the receipt of the material applicable thereto, that same invoice is immediately returned to the Purchasing Department. There it is held until a notification of the receipt of the material comes from the Receiving Department. At that time the paid invoice and the notification form are sent through for audit. If for any reason an adjustment is required, the Invoice Audit Department should be charged with the duty of originating the application for claim.

All invoices after being audited, vouchered, entered and paid, are finally filed in the Accounting Department.

Material Ledger Record of Receipts—Quantity.—There are several methods in use at the present time which allow the material ledger clerks information necessary for recording on the material ledgers the receipt of materials. Perhaps the method in most common use is one where the vendor's invoice alone is used as the posting medium. This method, of course, is the one used principally by the smaller concerns, although it is true that some large concerns find that it meets their needs not inadequately.

This method calls for the receiving clerk (generally the store keeper) noting on the invoice itself all essential facts concerning the receipt of material, either by a form sticker, a stamp fill-out, or notations in pen or pencil on the face of the invoice, Although it has its limitations for the large concern this method serves its purpose quite well for the small concern where it is not uncommon for the storekeeper to receive, issue, and account for material, and in addition maintain the material ledger in whatever form it is kept.

For the large concern with its extensive division of labor and responsibility, a more appropriate method is required—for combined with the possibility of invoices becoming lost or misplaced, are the extreme limitations affected by requiring several departments to carry on their work at practically the same time from but one document. There are, of course, many other reasons for the necessity of a method calling for material receipt documents independent of but a check on, the invoice itself, Most of these secondary reasons have been brought out in previous discussion.

Large concerns make use of either a receiving slip form or a receiving report form upon which to record transactions with respect to material received from outside vendors. The receiving slip is commonly known as the Notification of Material Received, and is used—one slip for each receipt of material applying against each individual Purchase Order. The receiving report form, commonly called a Material Received Sheet is used as a chronological record of receipts. It is safe to say that of these two forms, the former, or the Notification of Material Received, is the better practice. For each shipment of material received four copies of this form are generally made out by the receiving department. The disposition of these copies are:

Original: Goes to Purchasing Department.

Copy 1: Goes to storeroom with material and is retained by the storekeeper.

Copy 2: Goes to storeroom with material; is signed by storekeeper; is returned to, and held in files of the Receiving Department.

Copy 3: Goes to storeroom with material; is signed by storekeeper; is returned to Receiving Department and forwarded by that department to material ledgers.

In accordance with good form and design, it is customary not only to assign copy numbers and designate the destination of each copy, but also to have each copy printed on paper of a distinctive tint. This last is a small matter, but yet one which makes for convenience in the sorting and transmittal of the various forms.

Several features of the Notification of Material Received form shown on page 373 are worthy of attention. First of all, each set of four copies has its own serial number. This number appears at the upper, right-hand corner and is *printed* thereon.

The purpose of this serial number, as with all serial numbers, is to control each and every slip and to note any items that are missing. The next feature to observe is the space allotted for the storekeeper so that he may sign for the receipt of materials into *stores*. To which storeroom and in what location in the storeroom material received is to go, is noted in the lower, left-hand side. This information is obtained by the Receiving Department from its copy of the Purchase Order.

On the right-hand side of the form is a space for recording the material ledger number wherein the account for the specific material is kept. If reference is made to both the Purchase Requisition and the Purchase Order previously described, it will be seen that the material ledger, from which the requisition originates (in this case, 45) has been recorded in order that all copies of documents for that ledger may reach it easily. This same information as to material ledger number should be placed by the receiving clerk on all notifications of material received.

Let it be assumed that the posting of Material Receipts is made through the medium of the notification of material received. Copies of this form which bear the signatures of both the receiving clerk and the storekeeper are forwarded once, twice, or more often each day from the Receiving Department to the material ledgers. It is important that all slips reach the material ledgers promptly. At this point all slips are then sorted by ledger numbers and distributed to the proper ledger clerks who then refer their open Purchase Orders (and all papers attached thereto) and locate those Purchase Orders against which the sundry receipts of material apply.

The material ledger clerk should now have the following documents applicable to each receipt of material:

1. Purchase Requisition.
2. Purchase Order.
3. Notification of Material Received.

In addition he may also have these documents:

4. Purchase Requisition changes.
5. Purchase Order changes.

With these documents before him he is now in a position to make his postings in the material ledger—at least in so far as quantities are concerned.

As each posting is made to its proper material account all documents applicable to the item posted are assembled and filed away in a *completed* Purchase Order file—provided, of course, that the material received constitutes a complete delivery. Should only a part of the material as ordered be delivered, entry would be made in the ledger, and all documents returned to the *open* Purchase Order file until the next partial delivery has been received.

Receipts of Worked Material.—The previous paragraphs have described the methods used in securing a record on the material ledgers of the *quantity* of material received *from outside concerns*. There is, however, another class of material which requires its own ledgers. Such material is known as "worked material." Paul W. Atkins says:

> Worked material is the name given those materials, parts, subassemblies, etc., which are made in the factory and which are then stored till they are needed in the fabrication of merchandise. Another reason for this differentiation lies in the aid which it gives in maintaining the cost accounting records. The cost prices of stores is, of course, the purchase price plus, in some cases, the cost of transportation to the plant, and in almost all cases it can be determined with all needed accuracy even before the material reaches the factory. The cost price of worked material, on the other hand, must be calculated by the Cost Department, and hence the actual cost price is not available until sometime after the material is completed.

Raw material issued from raw material stores for production purposes, eventually finds its way into worked material stores where it is held until required for assembly purposes. From the time such material leaves the raw material stores until it reaches the worked material stores, record control of such material is obtained by means of production records so far as *quantity* is concerned, and by the cost ledger so far as *cost* is concerned.

When worked material passes into worked material stores, entries for all receipts must be recorded on the worked material ledgers in a manner not unlike the posting of receipts of materials from outside vendors on the raw material ledgers. There is one exception, however. While in the latter instance the medium of the posting may be the notification of material received or the vendor's invoice, in the former case the medium of posting is a document known as a Worked Material (W. M.) Received in Stores slip. This slip, a copy of which appears on the following

page, generally originates in some inspection department for the simple reason that all materials just prior to going into worked material stores are inspected. Usually a W. M. Received in Stores slip in triplicate accompanies the material from the inspection department to stores.

W.M. RECEIVED IN STORES				DATE 1/23/23
FORWARDED FROM INSPECTION DEPT. 17			BY HBC	SERIAL NO. 1503
DESCRIPTION OF MATERIAL: Side Arm Bracket				LOT NO. 62
PART NO. 7145	UNIT Pc	QUANTITY 9	UNIT COST 5.50	TOTAL 49.50
RECEIVED BY W.M. STORE NO. 4		RECEIVED BY H. Pickett		DATE RECEIVED 1/24/23
BIN TAG OLD BALANCE 72	BIN TAG NEW BALANCE 81	BIN TAG POSTED BY MDS.		
CHARGE			CREDIT	
W.M. ACCOUNT NO. 7145-A	POSTED J.S.	DATE 1/25/23	A-712	POSTED P.B. DATE 1/25/23

FIG. 59.—Worked material received in stores form.

After all copies have been signed by the storekeeper, the disposition of each copy is as follows:

Original: To Production Department for recording last movement of material; from there to worked material ledger.

Copy 1: Returned to Inspection Department.

Copy 2: Held by storekeeper.

As all original copies are received by the material ledger clerk they are sorted and posted to their proper accounts.

Materials in Excess of Quantity Ordered.—It is not unusual for a concern to receive and to be invoiced for a greater quantity of material than the Purchase Order calls for. Because of

physical characteristics, certain materials cannot, without too great an expenditure of time and money, be measured or weighed by the vendor to conform exactly to the Purchase Order quantity requirements. The result, of course, is either an "under" or "over" receipt at the plant of the purchaser.

"Under" receipts present nothing unusual. If the quantity received agrees with the quantity as invoiced by the vendor this transaction is handled similar to any regular transaction. Some record, however, must be made on copies of Purchase Orders to the effect that the receipt constitutes a complete delivery of the order if such is the case. Otherwise the record will show a balance still due.

In the instance of "over" receipts the first thing to be done is for the receiving department to notify the Purchasing Department of the amount of overage. The latter department should then instruct the former department either to accept the entire delivery or to hold out the excess for return to the vendor. If approval is granted for accepting the excess into stores such approval must, of course, reach not only the Receiving Department promptly but also the Invoice Audit Department and the material ledger clerks so that they may change their copies of the Purchase Order to agree with the accepted quantity. No entry with respect to a quantity received in excesss of a Purchase Order quantity, should be made on the material ledgers until the Purchasing Department's approval has been received by the ledger clerks.

Should the quantity of material received be less than the quantity shown on the vendor's invoice, a claim for the amount of the shortage should be made against the vendor.

Claims—Purchased Material.—On page 385 will be found an illustration of a form used for the purpose of making claim against vendors, when material received is not in accordance with the terms of the purchase contract. Such a form is called a Claim Application, and is used in the following instances:

1. *When Material Is Returned to the Vendor.*—Material may be returned to the vendor either because it was never ordered or because it does not come up to the requirements specified in the Purchase Order. Also, when the quantity received is more than the quantity ordered, the excess quantity is often returned. Many times, however, such excess quantity is accepted and used. In such cases there is no need of a claim application.

2. *When Material Is Damaged.*—Due to the carelessness of the vendor in manufacturing or in packing, material may arrive in a damaged or incomplete condition. Although the damage may not be serious enough to warrant returning the material to the vendor, it is serious enough to require repairing. When the work of repairing is performed by the purchaser a claim for the cost thereof is made on the vendor.

CLAIM APPLICATION

PACIFIC GAS AND ELECTRIC COMPANY

AUDITING DEPARTMENT
445 SUTTER STREET

CLAIM NO.
DIVISION CLAIM NO.
DIVISION

.....
[Dealer's Name]

San Francisco, Cal., 19

Dear Sir:—

This claim for $..... is made in connection with the following material { Returned / Damaged / Short }

charged on our order.....

Invoice No..... Dated..... Your Invoice..... Amt.....
[Dealer's Number]

for the following reason:

(Describe fully articles damaged, lost or otherwise not correct; on claims for defective material, note our invoice and dealer's number, covering charge for defective as well as replacing shipment.)

Please forward your credit memorandum in triplicate, noting our claim number thereon.

PACIFIC GAS AND ELECTRIC COMPANY,

.....Auditor

PER.....

NOTE: This form must be used for all claims due to damages, shortages or goods returned; also all freights paid and chargeable to shipper, work done to put apparatus into condition for use due to incomplete work of manufacturer, etc. (do not use for fuel oil claims.)

It is also important that you attach to this claim, the bill of lading or express receipt covering the return shipment. When forwarding via Parcel Post, material should be insured.

3. *When the Quantity of Material is Short.*—If the quantity of material received is less than the quantity invoiced by the vendor, a claim is made upon the vendor to make good the shortage, or forward a credit memorandum.

Whenever material is returned to the vendor, it should be charged back to him with the cost of all transportation and handling charges paid by the purchaser. It is also customary when forwarding the claim application (in the instance of returned

goods) to attach to it the bill of lading or the express receipt applicable to the shipment.

Material Record of Receipts—Cost.—The previous paragraphs have explained the methods whereby the quantity of material received either from an outside vendor, or transferred to worked material stores, is posted to the material ledgers. However, as most material ledgers carry the various items of materials in terms of *dollars and cents* in addition to the quantities, it is necessary to describe in detail how this feature is handled.

First of all it is the general practice of smaller concerns to use the vendor's or purchase invoice for the purpose of posting not only quantity, but also cost, to the material ledgers. This operation is done after the storekeeper (as he generally acts as the receiving clerk in the small concern) has checked in the receipt of material against the invoice and has returned the latter document to the Accounting Department. This department holds the storekeeper accountable for the return of all invoices.

Concerns of medium or large size use either of the following methods to post to their ledgers the cost of materials purchased from the outside concerns.

Method A.—Every Purchase Order sent out must show the exact price of the material being purchased. No estimated or approximate prices are permitted. Thus the material ledger clerk from his copy of the Purchase Order is able to obtain the unit price. This price multiplied by the quantity received gives a figure which represents cost—provided there are no transportation charges. As most purchases, however, are now made f.o.b. shipping point, it is required that transportation charges be added to the invoice amount. In fact at the present time freight rates are so high that in some instances the transportation expense per unit is almost as great at the purchase price per unit.

Because the Purchase Order does not furnish the ledger clerks with information pertaining to the transportation charges, the latter charges are placed upon the notification of material received. This precludes the necessity of passing the original invoices over the material ledgers.

Method B.—Vendors are requested to render their invoices either in duplicate or triplicate. The extra copy of each invoice goes to the material ledgers and is held until the receipt of the material covered by it. At that time the postings of cost and quantity are made together.

If, as the result of the invoice audit, any errors are discovered, the material ledger clerks are notified at once so that the ledgers may be adjusted.

Method C.—Some large concerns after establishing a control of all original invoices by means of registration, forward such original invoices as are required to the material ledgers.

Cost of Worked Material.—The cost of worked materials, instead of being obtained from invoices as exists in the case of raw materials, is obtained from the records maintained by the Cost Department. In other words, while the Production Department furnishes the worked material ledgers with information concerning the *quantity* of material, the Cost Department furnishes the *cost* thereof.

In the case of outside purchases, with but few exceptions, information concerning both quantity and cost are obtainable at practically the same time. This condition, however, with respect to worked materials, is just the contrary, for in most concerns costs are not obtainable until sometime after the material has moved into stores. In many instances worked material may move into stores, and later be requisitioned out and used, before the actual cost has been established. As there is need for having figures available for pricing requisitions it is quite important that some means be used which will not hold up such current pricing. A discussion of the usual methods employed will be found in Chapter XX which deals entirely with the subject of Material Prices.

CHAPTER XIX

STORING, ISSUING, AND MATERIAL VERIFICATION

STORING

Up to this point the following subjects with respect to material control have been discussed:

1. The material ledger.
2. Internal ordering.
3. Purchasing.
4. Receiving.

The next step in the cycle of material movement after ordering, purchasing, and receiving, deals with storing material. Therefore, the following pages are devoted to an explanation of the purpose and kinds of *stores* and of the records which the storekeeper is interested in.

The purpose of stores is principally three-fold:

1. To afford at some advantageous point in a plant a place where material is taken upon receipt and held until it is required.
2. To prevent material losses through stealing, misuse, deterioration, and misplacement.
3. To afford a place where material requirements can be easily and quickly filled.

In most small concerns there is but one storeroom into which all materials and supplies, of whatever nature are sent upon receipt from the vendors. Larger concerns, on the other hand, usually maintain several storerooms: a storeroom for raw or unworked materials; a storeroom for operating and maintenance supplies; a storeroom for worked materials; and a storeroom for finished merchandise. Very large concerns will generally be found to have more than one of the above classes of stores. For example, there may be one central storeroom for operating and maintenance supplies, and in addition substores in various departments or buildings, the stocks of which are replenished from time to time by the central storeroom.

While in theory all materials that are not in actual production or use should be located in their respective storerooms, in practice this ideal condition does not always exist. Exceptions to the theory are due in most instances to the physical nature of the materials. Coal, for example, is an operating supply, but by reason of its bulk cannot be located in the storeroom known as the operating and maintenance stores. Fuel oil, sands, scrap metals, and like materials are other examples. Irrespective of where such materials are located in the plant they are considered as being in stores—at least so far as the material ledgers are concerned.

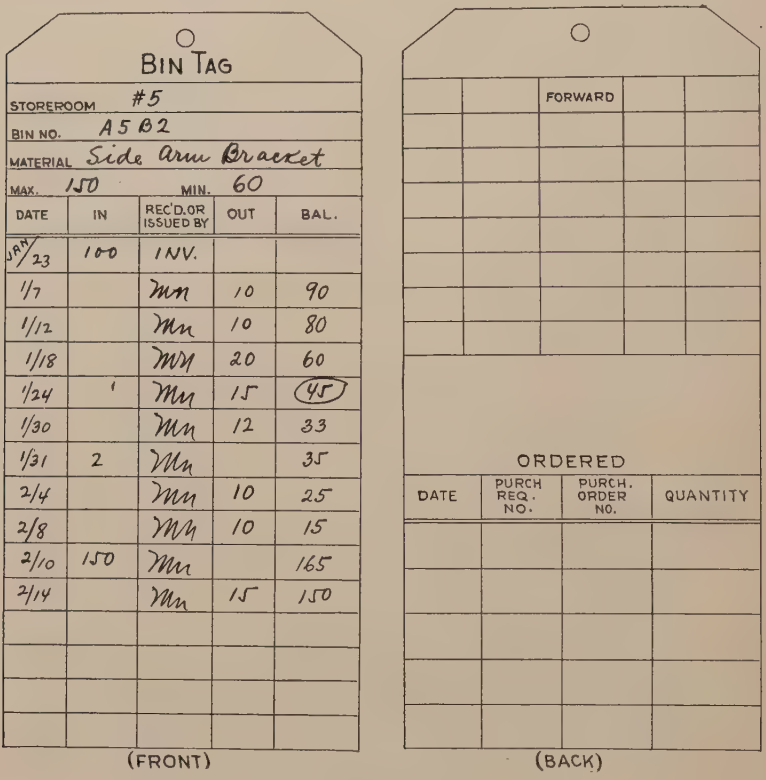
Returning at this point to the Receiving Department, it will be recalled that that department is advised to what storeroom material is to go by means of the purchase order (the receiving department's copy). Thus, after the receiving department has checked in the material it is dispatched to its proper storeroom. Whether the storekeeper accepts the receiving clerk's count or not depends upon several factors, one of which is the expense of duplicate checking, and another upon the opportunity afforded for stealing or losing material between the receiving department and the storerooms. The nature and value of the material is another factor.

It is customary for the storekeeper to sign for all material he receives into stores. Such a record is the means of charging him with the responsibility of accounting for the materials. The receiving slip used by the Receiving Department (see Notification of Material Received) can be designed to secure the storekeeper's acknowledgment of the receipt of material. Thus the form then becomes of double value to the material ledger clerks.

Bin Tags—Regular and Temporary.—Materials received at each storeroom are placed in their proper bins, compartments, or receptacles, and the quantity posted to the bin tag. If the Notification of Material Received form is correctly filled out by the receiving clerk it will show the exact storage place in the storeroom for the material. This saves the storekeeper the trouble of looking up this information for each receipt. Naturally new materials coming in for the first time cannot be handled so expeditiously for the reason that in such instances the storekeeper is required to assign new storage locations.

Entries made on bin tags appear similar to those shown here on the Bin Tag form. These bin tags are usually placed in

metal bin tag holders which are attached to the front of each bin. If the material, because of its bulk, cannot be placed in a bin, the bin tag holder is usually located on the wall either above or to the side of the material.



BIN TAG

STOREROOM #5

BIN NO. A5B2

MATERIAL Side Arm Bracket

MAX. 150 MIN. 60

DATE	IN	REC'D. OR ISSUED BY	OUT	BAL.
JAN 23	100	INV.		
1/7		Mm	10	90
1/12		Mm	10	80
1/18		Mm	20	60
1/24	'	Mm	15	(45)
1/30		Mm	12	33
1/31	2	Mm		35
2/4		Mm	10	25
2/8		Mm	10	15
2/10	150	Mm		165
2/14		Mm	15	150

(FRONT)

		FORWARD		

ORDERED

DATE	PURCH REQ. NO.	PURCH. ORDER NO.	QUANTITY

(BACK)

FIG. 60.—Bin tag.

The functions of the bin tag are:

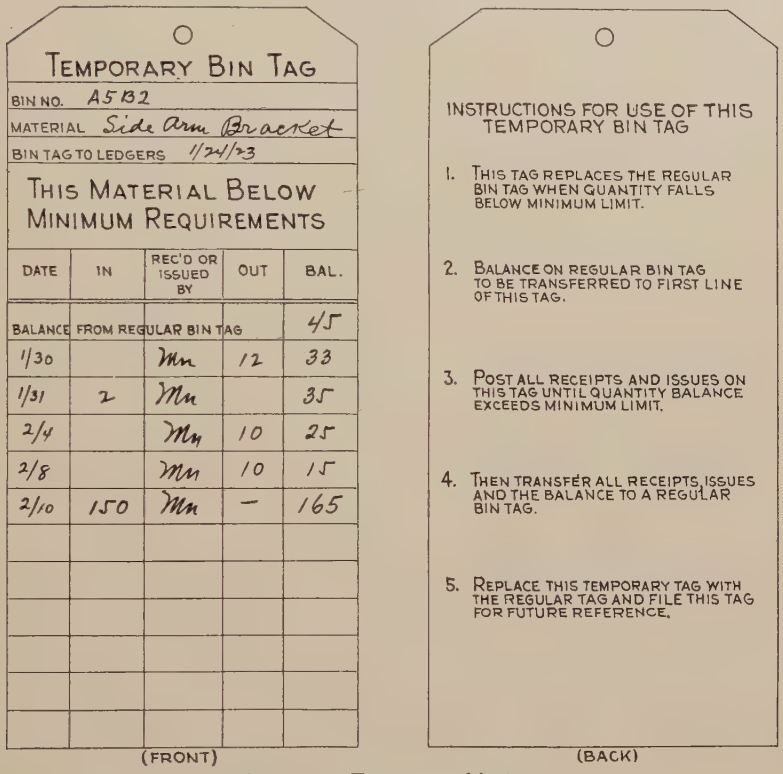
1. To indicate the location of the material.
2. To identify the material.
3. To afford the storekeeper a record of receipts and issues.
4. To show the quantity on hand.
5. To be used as a check upon the material ledgers when the balance on hand falls below the minimum limit.

In connection with this last function the procedure is substantially as follows:

1. When the balance on hand falls below the minimum limit the regular bin tag is taken from its holder and forwarded to the material ledgers.

2. Before it is forwarded, however, the balance is transferred to a form known as a temporary bin tag which is usually printed in red, and this temporary bin tag placed in the holder.

3. During the time the balance remains below the minimum limit all postings are made on the temporary bin tag.



TEMPORARY BIN TAG

BIN NO. A5132

MATERIAL Side Arm Bracket

BIN TAG TO LEDGERS 1/24/23

THIS MATERIAL BELOW MINIMUM REQUIREMENTS

DATE	IN	REC'D OR ISSUED BY	OUT	BAL.
BALANCE FROM REGULAR BIN TAG				45
1/30		Mn	12	33
1/31	2	Mn		35
2/4		Mn	10	25
2/8		Mn	10	15
2/10	150	Mn	—	165

(FRONT)

INSTRUCTIONS FOR USE OF THIS TEMPORARY BIN TAG

1. THIS TAG REPLACES THE REGULAR BIN TAG WHEN QUANTITY FALLS BELOW MINIMUM LIMIT.
2. BALANCE ON REGULAR BIN TAG TO BE TRANSFERRED TO FIRST LINE OF THIS TAG.
3. POST ALL RECEIPTS AND ISSUES ON THIS TAG UNTIL QUANTITY BALANCE EXCEEDS MINIMUM LIMIT.
4. THEN TRANSFER ALL RECEIPTS, ISSUES AND THE BALANCE TO A REGULAR BIN TAG.
5. REPLACE THIS TEMPORARY TAG WITH THE REGULAR TAG AND FILE THIS TAG FOR FUTURE REFERENCE.

(BACK)

FIG. 61.—Temporary bin tag.

4. When the balance *exceeds* the minimum limit, the temporary bin tag is removed, all postings thereon are transferred to the regular bin tag, and the latter tag replaced in the tag holder. All temporary bin tags thus replaced are filed for future reference.

The purpose of forwarding a regular bin tag to the material ledgers when the balance thereon falls below the minimum limit, is to notify the ledger clerk of the low position of stock in case he has failed to notice this condition from his ledgers.

While this feature works very nicely in connection with material ledgers which do *not* have the feature of apportionment, it does not afford the same benefits in the case of ledgers *with* apportionment features, because in the latter case the minimum limit is the quantity *available* and not the quantity *on hand*. In spite of this fact it is customary, even where material ledgers have the features of apportionment, for the regular bin tags to be forwarded from time to time to the ledgers in order that the balance on hand of one may be compared with the balance on hand of the other.

Location Cards.—As an aid to the storekeeper in quickly locating any material in stores, location cards are employed by most concerns. A location card generally contains a complete description of each material, *i.e.*, the kind, specification, color, size, weight, and location where the material is stored. Through the constant receipt and issue of materials a good storekeeper soon acquires the knowledge of exactly where most of his materials are located in stores. However, there are many times, especially if his stock is a large one, when he is required to turn to his location cards for the information he desires. Location cards although generally filed alphabetically by name of materials are sometimes filed by part numbers, particularly in the case of rough and finished parts, finished assemblies, and finished product which is specified by lot numbers.

These cards may be kept in a card file, or better still in one of the several excellent patented visible files.

ISSUING

It is an important rule of material control that no material should be allowed to leave the storeroom unless a properly signed requisition or other document of substantially the same nature has been received therefor. A requisition, or a written request for material, is the storekeeper's authority to issue material, and a document which releases his accountability for the quantity of material furnished by him to the requisitioner.

On page 393 will be found an illustration of a Stores Requisition. Some of the principal features of this form are as follows:

1. Serial number. Each requisition should bear an identifying serial number.
2. Description of material required.
3. Quantity of material required.

4. Stores location of material.
5. Name of person who delivers the material from stores.
6. Name of person who receives the material.
7. Date apportioned on ledgers.
8. Date of delivery of material.
9. Account to be credited.
10. Account to be debited.
11. Value of material.

R.M. STORES REQUISITION R.M.

STORE ROOM LOCATION				SERIAL NO.
R.M. Store #5				1481
DESCRIPTION OF MATERIAL				STORAGE LOCATION OF MATERIAL
Side Arm Bracket				A5 B2
PART NO.	UNIT	QUANTITY	UNIT PRICE	TOTAL AMOUNT
7145	Pc	10	2.50	$25
DATE WRITTEN	1-1-1923	DELIVER TO:		BALANCE ON HAND AFTER THIS ISSUE
DATE WANTED	1-7-1923	Machine Shop K		90
DATE ISSUED	1-7-1923			

CHARGE			CREDIT	
ORDER NO.		POSTED	ACCOUNT NO. 1897	POSTED
A-712		T.E.	LEDGER NO. 21 PAGE 4	A.H.
APPORTIONED	DATE 1-1-1923	DELIVERED BY B. Taylor (SIG.)		
BIN TAG POSTED	J.K.L.	RECEIVED BY O. Anderson (SIG.)		

FIG. 62.—Stores requisition.

At least two copies of each requisition are made—one for each party to the transaction. On the form shown here one item, only, of material is called for. Many times, however, the kind of product or method of production lends itself in such a way that a requisition to cover several different kinds of materials is used. An example of this type of requisition will be found on the next page.

While the greater portion of material, by far leaves the storeroom through the medium of requisitions, there are several

other mediums which effect the removal of materials from stores and also release the storekeeper from responsibility therefor. These documents necessarily fit in with the scheme of material control, but they will not be taken up for discussion here until all matters with respect to requisitions have been explained.

Originating the Requisition.—For the same reason that the issuing of bank checks is confined to a certain few persons in a

SHEET NO.	ORDERED BY	DATE WRITTEN	GROUP ISSUE REQUISITION				W.M.
1	M E J.	3/24/23					
NUMBER OF SHEETS	DELIVER TO DEPT.	RECEIVED BY	ISSUED BY	DATE ISSUED	ASSEMBLY NUMBER	ORDER OR ACCOUNT CHARGEABLE	
1	#24	O.B.E.	J.M.	3/7/23	5171	1731	

PART OR MATERIAL NO.	DESCRIPTION	QUANTITY WANTED	QUANTITY ISSUED	UNIT COST	EXTENSION		POSTED
1231	Front Plate	25	25	4.—	100	—	A.B.J.
2705	Side Arm (L)	50	50	1.50	75	—	E.O.
2706	" " (R)	50	50	1.50	75	—	A.B.J.
2902	Strap	25	25	.40	10	—	A.B.J.
3175	Bolts - special	10	10	.15	1	50	E.O.
	TOTAL				$261	50	T.E.M. 4/5/

FIG. 63.—Group issue requisition.

concern, it is customary to place authority for issuing requisitions on stores in the hands of only a chosen number of employees. A list of such persons is the means afforded the storekeeper for honoring or dishonoring any requisition. It is not hard to imagine the result if any and all persons are permitted to write out requisitions and obtain material therefor. As a result, one of the first things, so far as the control of physical issues of materials is concerned, is to establish a list of those persons whose signatures on requisitions are authority for the storekeeper to surrender a portion of his stores.

Next, a rule should be established to the effect that each requisition must show the order number, job number, or account number (depending upon the class of material) to which the material, to be issued, is chargeable. This feature requires the originator of the requisition to refer to documents which only those with authority to sign are furnished; affords the basis for cost accounting; and furnishes the storekeeper with an additional safeguard in connection with improper requisitions.

In small concerns the originator of the requisition is generally a foreman or the superintendent. Material required for different jobs is determined by the foreman's or superintendent's clerk, a requisition made out, and then submitted to the foreman or superintendent for signature. While this works satisfactorily in the small concern it would be entirely inadequate in the large concern, especially where the plant is on a quantity production basis. Here material must be ever on the move—withdrawn from raw stores at the proper time in order to be available when machines, tools, and men are available; placed in worked material stores as finished parts; withdrawn from worked material stores for assembly purposes; placed is assembly stores; withdrawn from assembly stores for final assembly; placed in finished merchandise stores for shipment to customers. All these movements must be scheduled ahead of time so that at the proper moment requisitions can be promptly dispatched to the proper stores.

Types of Requisitions.—In large concerns requisitions on stores divide themselves into five classes, namely:

1. *Raw Material Requisitions.*—These requisitions are for the purpose of securing raw or unworked materials from stores. Such material is usually charged to job, order, or lot numbers. These requisitions are made out and signed in the Production Department and forwarded directly to the storerooms at the proper time.

2. *Work Material Requisitions.*—These requisitions are used for the purpose of securing from worked material stores, either finished parts for assemblies, or finished assemblies for merchandise. They originate and are signed in the Production Department which dispatches them at the right time directly to stores. Delivery is then made. Charges for material are usually made to job, order, or lot numbers.

3. *Merchandise Requisitions (More Generally Called Shipping-orders).*—These requisitions are used to obtain merchandise from finished merchandise stores for shipment out of the plant, and originate either in the Order Department or the Sales Department. Requisitions are sent

direct to the storeroom and delivery is made to the Packing and Shipping Departments. Charges for such materials are made to cost of goods sold.

4. *Operating and Maintenance Supplies Requisitions.*—These requisitions are used to obtain supplies used for operating the plant and supplies necessary for maintaining or keeping the plant in a good operating condition. Requisitions for operating supplies are made out by foremen of operating departments, while requisitions for maintenance supplies are usually made out by the foremen of the maintenance departments such as carpenter, plumbing, electrical, etc. In the latter case, however, requisitions may originate in the office of the plant engineer.

Charges for such materials are made to various operating and maintenance expense accounts, although on some maintenance work the charge is made to a job number for cost purposes and the total cost of the job cleared out into some maintenance account at a later date.

5. *Construction Requisitions.*—These requisitions are used to obtain supplies to be used on work which will eventually be charged to the property accounts. They are made out in the office of the plant engineer, and material called for on them is charged to a construction or new work order number. Cost records are kept for each such order number and when the work is finished the entire cost charged to some property account.

In order clearly to distinguish one kind from another, requisitions applicable to each class are either printed with different colored inks or on different tinted paper.

Single Issue and Group Issue.—Requisitions on stores may be designed for single issues or for group issues. In the case of single issue requisitions not more than one kind of material should be found thereon. In other words, a separate requisition should be used for each kind of direct material to be withdrawn from stores.

Group issue requisitions, on the other hand, are designed to allow several kinds of direct material to be withdrawn from stores on one requisition. Illustrations of a single issue requisition and a group issue requisition have already been given.

Group issue requisitions are especially used in withdrawing worked materials for assembly purposes. In certain concerns—paint manufacturers, manufacturing chemists, and concerns making a product which is a combination of several materials at practically the first process—the group issue requisition will be found being used for raw materials.

From the standpoint of material ledger work the single issue form is preferable. Where there is but one item on a requisition, that requisition needs only to be directed to *one* material ledger for its posting. On the other hand, a group issue requisition may show ten items of material, each one of which is located in a different ledger. As a result that one group issue requisition must pass over and be posted to ten ledgers. In this latter case there is always the chance that one or more items may not be posted.

So far as cost accounting is concerned the group issue form has a slight advantage over the single type because there is less effort required in assembling material costs.

Substores—Receipts and Issues.—As has been previously explained, many of the larger concerns make the practice of maintaining, in addition to the main storeroom, one or more small storerooms generally known as substores. These substores are so located as to be more convenient than the main storeroom to the departments, processes, or employees using the materials. The advantage, and in fact the necessity, of such substores is quite apparent especially if the concern is of any reasonable size.

These substores keep their materials and supplies above their respective minimum limits by drawing on the main storeroom. The form used to obtain replenishments is commonly known as a Substores Requisition.

The main storeroom once having issued material to substores holds a receipt, evidenced by the substores requisition. So far as the Material Control Department is concerned the exact use of these substores requisitions upon their receipt from the main stores depends entirely upon the following:

1. Relation of substores to main stores.
   a. Whether each substore is to be considered as an individual unit with separate and distinct accountability.
   b. Or, whether substores are assumed to be a part of the main storeroom and accountability made collectively.
2. Method of material accounting.
   a. Whether or not separate ledgers are to be maintained for each individual substores in addition to ledgers for the main storeroom.

As a rule it will be found that where accountability attaches individually to substores, separate ledgers are maintained for

each substore. In such cases the substores requisition must be used both as a credit to the "Main Storeroom Material" accounts, and as a debit to the "Substores Material" accounts. On the other hand, where the substores are assumed to be a part of the main storeroom and no separate ledgers are kept, the substores requisition on main stores has no accounting value or use so far as the material ledgers are concerned, for the reason that the balance on hand is not reduced in any way.

Requisitions *drawn* on substores by various departments, and filled, are, in the first instance above, forwarded direct to the Material Control Department and the various accounts in the material ledgers applicable to substores credited. Where the second instance above maintains, all filled requisitions on substores are cleared through the main storeroom before being sent to the material ledgers.

Requisitions "Filled" in Receiving Department.—All materials and supplies should, if possible, go into stores first and then be requisitioned out. In connection with some special purchases of unclassified items, however, this procedure would be a waste of time. So as to avoid useless handling and to allow the material to be delivered directly from the Receiving Department to the place where it is to be used it is quite customary to adopt the following procedure:

1. Receiving Department notifies the person desiring the material. (When the purchase of an item for immediate or special use is made the purchase order copy for the Receiving Department shows for whom purchased.)
2. The person so notified sends a Stores requisition properly filled out to the Receiving Department and in return therefor gets the material.
3. Receiving clerk then submits both the requisition and the receiving slip to the storekeeper and surrenders the requisition after the storekeeper has signed the receiving slip.
4. The requisition and the receiving slip go through their regular channels to the material ledgers and are posted.

Apportionment before Issue.—Under the more advanced method of material control, materials required for production are apportioned or reserved on the material ledgers (sometimes, but not often, the physical material itself is set aside or reserved in the storeroom) before they are requisitioned and issued from stores. These apportionments or reservations are generally posted from requisitions which are made out some time in

advance of their issue by the Production Department, passed over the material ledgers for apportionment purposes, and then returned to the Production Department to be held until the proper time arrives for dispatching them to the storeroom in accordance with a predetermined schedule. The definition and purpose of apportioning has already been explained.

As each apportionment is made, the quantity available is decreased to the extent of the quantity apportioned, and the total quantity apportioned is increased. Should a requisition which has been apportioned be canceled before it has been issued, it must be passed back across the ledger in order that the quantity available may be increased and the quantity apportioned or reserved, decreased.

Filling Requisitions.—As each requisition is presented to the storekeeper it is filled and the material sent to the department requiring it. Each issue thus made is subtracted from the quantity shown on hand on the bin tag.

In filling a requisition on stores the requisitioner may be compelled to accept:

1. A quantity less than the quantity requisitioned.
2. A quantity equal to the quantity requisitioned.
3. A quantity greater than the quantity requisitioned.

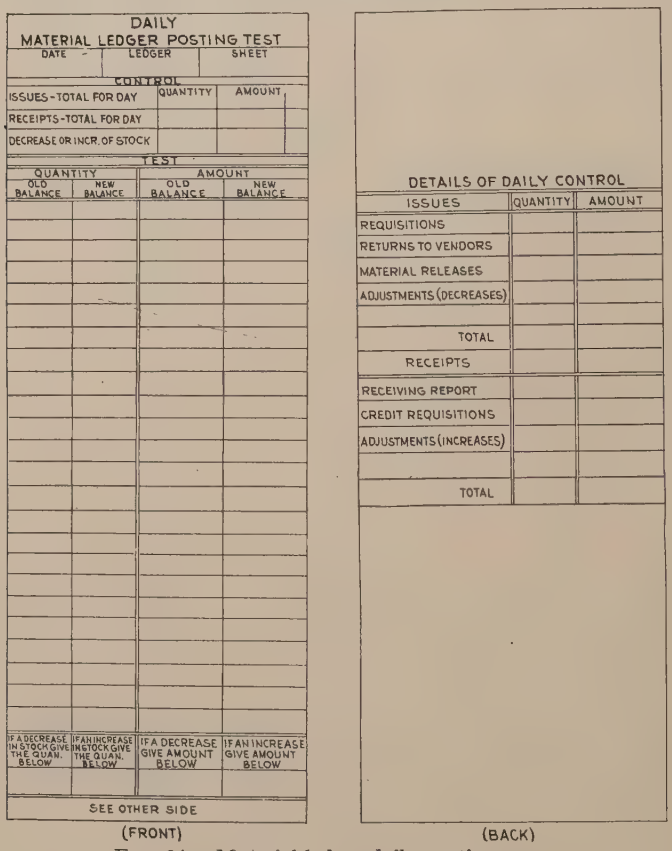
Should the quantity issued be more or less than the quantity requisitioned, a change must be made on the requisition. A line drawn through the original quantity and the new quantity initialed is sufficient in most cases. So far as excessive quantities are concerned it happens many times that the nature of the material makes it necessary to issue it in irregular quantities which very seldom agree with those shown on the requisitions. Shortages, on the other hand, must be reported by the storekeeper at once, and the balance unfilled recorded by him on a record which he generally keeps for the purpose.

Requisitions which have been filled are then forwarded to the material ledgers once or twice a day.

Posting Requisitions to Material Ledgers.—Requisitions representing material issued from stores, received from the storekeeper by the Material Control Department are first sorted according to their respective classes, *i.e.*, raw material, worked material, etc. They are next sorted according to the different individual ledgers to which they apply, and where pricing is

done from a card index instead of from the ledgers directly, this arrangement should agree with the arrangement of the card index. These two operations are generally done by persons other than the ledger clerks.

The next operation is that of pricing and extending. Although the operation of pricing is a simple task, requiring but speed and



DAILY
MATERIAL LEDGER POSTING TEST

DATE	LEDGER	SHEET

CONTROL

	QUANTITY	AMOUNT
ISSUES - TOTAL FOR DAY		
RECEIPTS - TOTAL FOR DAY		
DECREASE OR INCR. OF STOCK		

TEST

QUANTITY		AMOUNT	
OLD BALANCE	NEW BALANCE	OLD BALANCE	NEW BALANCE

and arriving at a total which is supposed to represent the cost of the material issued for consumption. Unit prices for pricing purposes are generally secured, not direct from the material ledgers, but instead from a record especially prepared for the purpose of pricing. This record is generally known as a price file.

After each requisition has been priced and extended it is customary to have the extensions verified. The next operation is that of posting the requisitions to the ledgers. This operation, however, will have to be discussed from two standpoints since posting to a material ledger designed with apportionment features differs in several respects from posting to a ledger designed without such features.

Ledgers without Apportionment Features.—Where ledgers do not have apportionment features, one section of the ledger sheet (the Issued Section) is affected.[1] Under that caption the requisition date and number, the quantity, and the amount, are entered. Whether or not a balance for quantity and amount is brought down depends upon the design of the ledger sheet. Some ledger sheets make no allowances for balances after every posting. Instead, the balance must be ascertained by subtracting the total of all issues from the total of all receipts. There are other ledger designs which do permit both the new quantity and amount balance to be shown directly.

As each requisition is posted it is initialed by the material ledger clerk in the space usually allotted for that purpose.

Ledgers with Apportionment Features.—Where ledgers have the apportionment features two sections (On Hand and Apportioned) of the ledger sheet are affected by an issue of material. Naturally, if material has been issued for a certain job or order, then it is no longer on hand in stores and reservation for this material is no longer required. The material ledger clerk, therefore, posts from his requisition first to the On Hand Section bringing down his new balance, and then to the Apportioned Section, subtracting the requisition quantity from the total shown apportioned there but unfilled.

Should a requisition apply against a job or order for which material has not been apportioned, the two sections On Hand and Available are affected by the withdrawal of material from stores, instead of the two sections On Hand and Apportioned. In case the quantity Available is not sufficient to cover the issue (a condition which in certain isolated cases happens) or if the issue draws the Available quantity down to a point below the minimum limit, a purchase requisition must be filled out at once.

[1] Sometimes two sections are affected if the ledger form has a special section for Balances.

It has been mentioned previously that the storekeeper may be required to issue a different quantity of material than a requisition calls for. Generally such differences under a properly operated scheme of apportionments are averages which are principally due to the nature of the material itself. In such cases when posting the issue, the On Hand Section should be reduced by the exact quantity issued, the Apportioned Section reduced by the quantity originally apportioned, and the overage taken from the Available Section.

As each requisition is posted it is initialed by the material ledger clerk in the space usually allotted for that purpose.

Sometimes each material clerk is furnished with a rubber stamp of the following design which he uses on each requisition after it has been entered on the ledger. This should prevent a requisition being entered more than once.

ENTERED
CLERK NO. 14

Material Releases from Stores.—From time to time, even where the most careful storekeeping methods are operative, the condition of certain materials becomes such as to require their removal from stores. Or, perhaps, certain purchased materials already in stores are to be shipped back because it appears from a test of a certain portion of them that the remainder is unsuitable for use. Or again, a sale of some operating or maintenance supplies is made to some local industry as a matter of courtesy to help it out of a difficult situation.

In order to get this material out of stores, some concerns use a Material Release slip instead of a requisition. This form is generally made out by the official in charge of stores, and is used for ordering special issues only from the storerooms.

If this form is employed it should, of course, be treated, so far as the material ledgers are concerned, as a requisition. All release slips which have been filled go forward from the storekeeper to the material ledger each day.

There is only one feature that needs to be discussed with respect to posting release slips to the material ledgers. It is this: in the case of ledgers with apportionment features the two sections On Hand and Available will be reduced instead of the

On Hand and Apportioned. Materials on such release slips are very seldom apportioned before issue.

Material Returned to Stores.—For any one of a large number of reasons material once issued from stores may be returned to it. The material so returned to stores may be the entire original issue, or, as is usually the case, but a portion of it.

Accompanying the material being returned to stores is a form which goes under several different names. A few of these

MATERIAL RETURNED TO STORES SLIP

DATE	FROM DEPARTMENT	SERIAL NO.
Jan. 31. 1923	Grinders	167

DESCRIPTION	QUAN.	UNIT	UNIT PRICE	AMOUNT
Side Arm Bracket	2	Pc	2.50	5

CHARGE		CREDIT	
STORES SYMBOL	POSTED MAT. LEDGER	JOB, LOT OR ORDER NO.	ENTERED COST SHEET
#7145	ARJ.	A-742	TE.

REQUISITION ON WHICH MATERIAL WAS ORIGINALLY ISSUED

DATE	NUMBER		QUANTITY	UNIT PRICE	AMOUNT
1/30/23	1695		12	2.50	#30

RECEIVED BY STORES		RETURNED TO STORES BY
DATE		
1/31/23	P. Taylor SIGNED	J. Kelly SIGNED

FIG. 65.—Material returned to stores slip.

names are Credit Requisition, Stores Credit, and Material Returned to Stores. The last name will be used here because it is less confusing than the others. This form is made out in triplicate by the person returning the material. The copies are distributed as follows:

Original: to the storekeeper with the material.
First copy: to the material ledgers.
Second copy: retained by originator.

After the storekeeper has received the material back and has increased his bin tag quantity, he forwards the original Material

Returned to Stores slip to the Material Ledger Department. In the meantime the first copy has reached the Material Ledger Department. The two copies are then matched, and if they agree, the duplicate is destroyed and the original is ready for pricing, extending, and posting.

In posting material credits to a material ledger *without* apportionments, the balance on hand will be increased and the total of issues decreased. Where the ledger *is* designed for apportionment the material credit is added to the On Hand Section and also to the Available Section.

Controlling Accounts—Materials.—After all requisitions have been posted, they are totaled according to the various material ledgers for which controlling accounts are being maintained. For example, if a "controlling" account is being kept for all raw materials, then the total of all issues of raw materials during a period should be credited to the "Raw Material Controlling" account and the same total debited to some other account. So far as issues are concerned the following controlling accounts are usually affected:

1. Raw material issues.
   Debit—Work-in-process Inventory.
   Credit—Raw Material Inventory.
2. Worked material issues.
   Debit—Work-in-process Inventory (Assemblies).
   Credit—Worked Material Inventory.
3. Finished merchandise issues.
   Debit—Cost of Goods Sold.
   Credit—Finished Merchandise Inventory.
4. Operating and maintenance supply issues.
   Debit—Overhead accounts.
   Debit—Construction accounts.
   Credit—Operating and Maintenance Supply Inventory.

The amount applicable to each controlling account is the *net* figure, *i.e.*, the total issues from stores less the total returns to stores. The difference, of course, is the real amount issued. Some concerns, however, credit their "Material Controlling" accounts with the amount of gross issues as represented by all requisitions and let all returns to stores be considered as receipts. The first method is the more correct as it does not bring about an inflated figure for both consumption and receipts.

Distribution of Material Control Records

Name of form	Place of origination	Number of copies	Final distribution of copies					
			Original	First copy	Second copy	Third copy	Fourth copy	Fifth copy
Ordering and Purchasing								
Purchase Requisition	Material Control Department	2	P.	M.C.				
Charge of Purchase Requisition	Material Control Department	2	P.	M.C.				
Purchase Order	Purchasing Department	6	V.	M.C.	Au.	R.	P.	P.
Charge of Purchase Order	Purchasing Department	6	V.	M.C.	Au.	R.	P.	P.
Receiving								
Notification of Material Received	Receiving Department	4	P.	M.C.	R.	S.		
Storing								
Worked Material Received in Stores	Inspection Department	3	M.C.	S.	I.			
Regular Bin Tag	Stores Department	1	S.					
Temporary Bin Tag	Stores Department	1	S.					
Shipping Order	Order Department	3	Sh.	M.C.	Or.			
Issuing								
Stores Requisition	Production Department Foremen	3	M.C.	S.	Pr.			
Group Issue Requisition	Production Department	3	M.C.	S.	Pr.			
Material Returned to Stores	Foremen	3	M.C.	S.	Dp.			
Material Control								
Material Ledger Form	Material Control Department	1	M.C.					
Inventory Verification Slip	Material Control Department	2	S.	M.C.				
Stores Inspection Request	Material Control Department	2	I.	M.C.				
Material Release Slip	Material Control Department	3	M.C.	S.				
Inventory Difference Slip	Material Control Department	1	M.C.					
Inventory Adjustment	Material Control Department	3	Ac.	G.M.	M.C.			
Control Sheet—Maximum and Minimum	Material Control Department	2	G.M.	M.C.				

Ac.....Accounting Department.
Au.....Auditing Department.
Dp.....Operating or Maintenance Department.
G.M.....General Manager.
I.....Inspection Department.
M.C.....Material Control Department.
O.....Order Department.
P.....Purchasing Department.
Pr.....Production Department.
R.....Receiving Department.
S.....Stores Department.
Sh.....Shipping Department.
V.....Vendor.

When all requisitions and Material Returned to Stores slips have been posted in the material ledgers and then summarized for controlling account purposes, they are usually sent to the Cost Department for distribution and posting to various jobs, orders, lots, or processes cost sheets.

VERIFICATION OF MATERIAL BALANCES

Among other things, material control requires that the ledger balances of materials on hand be dependable. Nothing, perhaps, is so annoying, unsatisfactory, and at the same time so damaging to the reputation of a material control system, as the discovery that the amount of material, which the material ledger shows to be on hand, is not in agreement with the actual quantity of material itself. Once confidence in the material records is gone the whole control breaks down and chaos takes place. It is necessary, then, to take such precautionary procedures as will make the figures which appear on the material ledgers not only dependable at certain times but, indeed, dependable at all times. One way this can be done is to have a good checking system in operation; a checking system which will afford a thorough verification of the book balances with the actual materials themselves.

The features of a good checking system are:

1. It should be systematic. This requires that the work should be so planned that *every* item of material should be verified.
2. It should be frequent. This requires that each kind of material should be verified at least a certain number of times within each period.
3. It should be thorough. This requires exact counting, weighing, and measuring—not estimated quantities.
4. It should be informative. This requires that the physical condition of the material verified be reported in every instance.

Causes of Differences.—Causes of the difference between the book balance of material on hand and the actual material count divide themselves into two groups:

1. Differences caused by errors in the treatment of the material control records and postings.
2. Differences caused by the treatment of the material itself.

Within the first class fall the following differences:

a. Failure to post receipts of material.
b. Failure to post issues of materials.
c. Failure to post adjustments.

d. Failure to post return of material to stores.
e. Errors in posting.
f. Posting to wrong account.
g. Lost material receipts, requisitions, returns to stores, and adjustment slips.

Within the second class are the following:

a. Errors made in receiving material into stores.
b. Errors made in issuing material—over- or underissues.
c. Loss of material due to anyone or combination of the following:

(1) Theft.
(2) Deterioration.
(3) Breakage.
(4) Shrinkage.
(5) Seepage.
(6) Lack of care.

d. Material misplaced and lost in storage.
e. Incorrect identification and description of materials counted.

It will be readily seen that the causes within the first class are clerical irregularities. These may be largely prevented by methods which result in a check by means of control figures. The causes of differences falling within the second class may be largely removed by proper methods of storekeeping.

Principal Cause of Discrepancy.—Incorrect identification by the ledger clerks of materials received and issued is perhaps the most common cause for discrepancies between the ledger quantity and the physical count. In other words, posting to the wrong material account either upon the receipt of material or upon the issue thereof, naturally leaves one account showing too large a balance and another account showing too small a balance by the same amount.

Every precaution should be taken to make material ledger posting as error-proof as possible, because errors of the kind above are hard to detect. This is so for the reason that the Raw Material Controlling account is not affected in instances of wrong account posting.

Because of the preponderance of issues from stores over receipts into stores most errors in wrong account posting arise from failure properly to identify material on stores requisitions. Hence it is not uncommon, although none too prevalent, to find the requisition form designed to afford the material ledger clerks

more than one means of matching up the requisition with the material account before making the entry. Two of these means for additional verification of a requisition with the material ledger account are:

1. Giving code numbers to each kind and size of material.
2. Storage location of material.

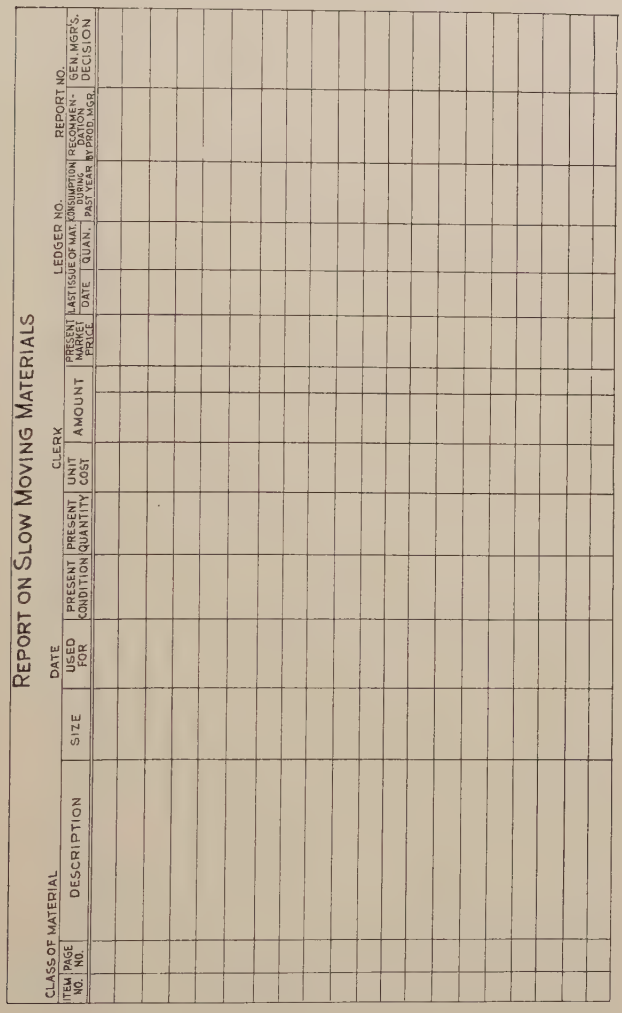
   The storekeeper places on each requisition the location from which the material has been withdrawn. This location should agree with the location on the material ledger sheet. If requisitions pass over the material ledgers for apportionment the ledger check can supply the location instead of the storekeeper.

Overages and Shortages.—The differences between the ledger balances and the physical counts are, in the greater majority of cases, shortages. Because, however, overages occur, is no reason for omitting to inquire into the causes thereof. Such overages may mean that invoices and notices of material received have never reached the material ledgers, although the material itself has gone into stores. Before discussing the subject of differences further, especially with respect to the methods of making adjustments, it is necessary to take up first the ways of determining differences.

Verifying the Ledger Balance of Material on Hand.—That a difference exists between the book quantity shown to be on hand and the actual quantity of material itself can only be established after a counting, measuring, or weighing of the material. It is necessary, therefore, to determine when such counting, measuring, and weighing should be done, how it should be done, and who should do it.

With respect to when, and how often, material in the storerooms should be counted, it is necessary to point out first, that for obvious reasons material having a high unit value and supplies which are useful for home consumption should be verified more often than less valuable and less useful (for personal use) supplies, respectively. In addition, operating maintenance supplies which are subject to theft because of their size and resale value should generally deserve more frequent counts than others of their class. The above materials, however, are in the small minority. The big problem concerns itself with the great bulk of other materials.

It has generally been said that the correct time to count material is when that material has reached its low or minimum limit. Whether or not this would permit a systematic verification whereby all materials are verified at least once during a



REPORT ON SLOW MOVING MATERIALS

CLASS OF MATERIAL — DATE — CLERK — LEDGER NO. — REPORT NO.

ITEM NO.	PAGE NO.	DESCRIPTION	SIZE	USED FOR	PRESENT CONDITION	PRESENT QUANTITY	UNIT COST	AMOUNT	PRESENT MARKET PRICE	LAST ISSUE OF MAT. DATE	LAST ISSUE OF MAT. QUAN.	CONSUMPTION DURING PAST YEAR	RECOMMENDATION BY PROD. MGR.	GEN. MGR'S. DECISION

Fig. 66.—Report on slow moving materials.

given period is another matter. It is necessary, of course, that the verification extend to each and every material, for unless this is done an opportunity is given for questioning the reliability of the inventory as a whole. Not only should the physical check

be systematic, but it should also be frequent, for upon the number of times a year the items are checked depends the accuracy of the book figures. Items checked twice a year, for example, have a six-month period within which to vary from the records; items checked four times a year have one-half the period above before differences may be discovered.

One method of verification in use has the following features:

> The inventory foreman, or storeman, or storekeeper, depending upon the size of the concern, lays out his program of work so that he starts at a certain point in the storeroom and commences to count each and every kind of material (without regard to whether or not the material has reached its low limit) until all has been counted. He reports his count on special forms and forwards these daily to the material ledger clerks who adjust their ledgers accordingly.

While this method has the advantage of being more systematic than any other method, since no material should be overlooked by this procedure, it is very wasteful of time because the greater majority of articles will not be at their low limits when the count is made.

A second method, deserving of but passing consideration, requires the storekeeper to select at random and count such materials as he feels have reached a low quantity point. He is usually required to make such countings during those periods when his other duties do not require his services. It seems hardly necessary to say that this method of verification is far from satisfactory, especially in view of the fact that it leaves the whole matter without any control whatsoever. The storekeeper may or may not feel like counting; he may or may not have time; and it is a pretty safe bet that under ordinary circumstances the material easiest to inventory will always get the preference, even to the extent of verifying it more than once within a given period to the total exclusion of material more difficult to handle.

A third method, which, it is felt, more nearly meets the requirements of a proper physical verification than any other method, commences its operations from the material ledgers. If the ledger form has been properly designed, and contains the necessary amount of information, it is the most logical place to commence. It shows when the low quantity limit has been reached. It shows the exact location of the material. It gives

information concerning the perishability and value of the material. The date of the last verification is given. With this and such other information as is on the ledger form, the material ledger clerks are in a better position to bring about both a more systematic and frequent physical count than anyone else. While either storemen or a special inventory gang may count the material, what they are to count, and when and where they shall count it, remains for the ledger clerks to decide. This procedure, similar to other material procedures, is controlled by means of the data on the material ledgers, a condition which a material control system requires as a means for producing best results. A description of this method is given in the paragraphs which follow.

Detailed Verification Procedure.—Each day the material ledger clerk selects from his ledgers those items which he notes have reached their low quantity limit. In fact he is required to obtain this important information and use it as the basis for requesting replenishment of stock through purchase requisitions. This information he transcribes to a form known as an Inventory Verification slip giving such information as is required for Section 1 of this form. (See following page.)

It will be noted that this form is divided into three sections. The first section is filled out by the ledger clerk and then transmitted to the person or persons responsible for making the count. The quantity which appears on the ledger is not placed on the form at this time. When the count has been made, Section 2 is filled in by the counters, the form then being returned to the ledger clerk who supplies the data in Section 3. The information furnished by the completed form is now a means not only for verifying the accuracy of the book balance but also for instituting action with respect to both the running down of abnormal shortages or overages and the better care and protection of the material itself.

The ledger clerks should of course plan to supply the counters with enough work to keep the process of physical inventory in continuous operation, and at the same time arrange their schedules so that all materials will have an opportunity to be verified. This means that in addition to the check on active materials, which reach their low limits perhaps several times during the period, it is necessary to check up each day, in some systematic manner, certain items of less active materials so that these items

will also be covered at least once or twice within the year—and more often if possible. If low-limit items only are accepted for verification, the entire number of inventory items will not be verified.

The counting of material by itself is not enough. The counters should also be charged with the responsibility of reporting upon

SEC.1 — INVENTORY VERIFICATION SLIP — RM

LEDGER	PAGE	DATE	CLERK	SERIAL NO.
19	57	3/6/23	Holt	7525

COMMODITY: Brace Strap (Leather)

SIZE	REPORT INVENTORY QUANTITY IN UNITS OF
3"x18"	Pcs.

PART NO.	LOCATION OF MATERIAL		
	BUILDING	DEPT.	DEPT. STORAGE LOCATION
7005	71	17	B3C2

SEC.2 — TO BE FILLED IN BY INVENTORY FOREMAN

ACTUAL COUNT	BIN TAG BALANCE	LAST ISSUE		REMARKS	SIGNED
		QUAN.	DATE		M. Casey
135	158	32	3/5	12 pcs. of old material	DATE 3/7/23

FOREMAN: USE OTHER SIDE OF THIS FORM FOR SPECIAL COMMENTS ON CONDITION OF MATERIAL

IS THIS MATERIAL IN SATISFACTORY CONDITION: YES ✓ NO

SEC.3 — TO BE FILLED IN BY MATERIAL LEDGER CLERK

ACTUAL COUNT	LEDGER BALANCE	PAPER IN TRANSIT		DIFF.	RECORDS		
		INCREASE	DECREASE		POSTED TO LEDGER	INSPECT. SLIP	INVENTORY DIFFERENCE SLIP
135	190	—	32	23 Short	H.	895	6782

NOTE: EACH SLIP BEARS ITS OWN INDIVIDUAL NUMBER. EACH ONE MUST BE RETURNED TO AND ACCOUNTED FOR BY MATERIAL LEDGER CLERKS. SLIPS MUST NOT BE DESTROYED.

FIG. 67.—Inventory verification slip.

the condition of each kind of material with which they come in contact. Allowing material to be counted without comment being made as to its physical condition is an acknowledgment that the information being used for verification purposes is not complete. All material shown by the ledgers to be available should be good and usable material, and the ledgers are not reliable if they show, for example, 25 pieces of a certain part to be on hand, when, as a matter of fact, only 18 of the 25 are in a condition fit to be used.

Reporting the condition of material at the proper time has been the means of saving thousands of dollars. Rubber, for example, drys out and cracks; leather loses its oil and also drys out; steel sheets rust and rods become pitted; highly polished parts become scratched, scarred, and rusted; valuable liquids are lost through leakage, seepage or evaporation. Many other materials deteriorate very rapidly in storage. If discovered at the proper time such deterioration can be checked either by the immediate use of the material to the exclusion of more recently acquired purchases, or precautions taken such as reoiling and slushing and the instituting of better storing methods.

When the Inventory Verification slips, with information concerning quantity and condition, have been returned by the counters to the ledger clerk, he is in a position to take further action. In the first place he should determine if a discrepancy between the book and the actual quantity exists. To do this demands, in addition to the two respective quantities, the recognition of all paper in transit, *i.e.*, requisitions, receiving slips, etc., which have had their effect upon stores, but which have not yet reached the ledgers. Although the Inventory Verification slip is designed to allow for the inventory foreman's record of the last receipt and issue from stock, it is far more satisfactory if the bin tag itself is forwarded to the ledgers with each verification slip. The bin tag entries compared with the ledger entries will very soon disclose what paper has not yet reached the material ledgers. A temporary bin tag should be kept in the place of the original bin tag until the latter is returned.

The next procedure for the clerk, in cases where discrepancies exist, is to decide if they are reasonable or unreasonable. If unreasonable the attempt should be made first, to check the correctness of the entries made in the ledger. The bin tag accompanying the verification slip is possibly as good a means as any for doing this. All additions and subtractions should also be checked. When every possible means of locating irregularities in the clerical work has been exhausted and reconciliation has not been effected, the cause for the remaining balance of the discrepancy may reasonably be laid at the door of storekeeping methods and control. In every case of discrepancy, however, no adjustments to the ledgers should be allowed until the ledger clerk has reported and apprised the superintendent of materials of such and has received a signed approval from him for the entry.

The means for reporting discrepancies to the superintendent of materials is the Inventory Difference slip. This form, it will be noted, gives all the necessary and pertinent facts applicable to the difference discovered as a result of the physical check. In addition to being the medium for making adjusting entries in the ledgers after it is properly signed, it allows the superintendent an opportunity, when he deems the occasion

INVENTORY DIFFERENCE SLIP RM.

LEDGER	PAGE	DATE	CLERK	SERIAL NO.
19	57	3/8/23	Holt	6782

COMMODITY: Brace Strap (Leather)

SIZE 3"x18"

PART NO.	LOCATION OF MATERIAL		
	BUILDING	DEPT.	DEPT. STORAGE LOCATION
7005	71	17	B3C2

LEDGER BALANCE	PAPER IN TRANSIT		ACTUAL COUNT	DIFFERENCE (DENOTE OVERAGE IN RED)	DATE OF LAST COUNT
	INCREASE	DECREASE			12/6/22
190	—	32	135	23	DIFFERENCE AT THAT TIME 14

INVENTORY DIFFERENCE APPEARS TO BE			APPROVED FOR INVENTORY ADJUSTMENT		
			QUANTITY	DATE	SUPT. OF MATERIALS
	REASONABLE				
	UNREASONABLE	✓	23	3/11/23	J. Murphy SIGNATURE

UNIT COST		TOTAL AMOUNT OF ADJUSTMENT		INCLUDED IN REPORT OF ADJUSTMENTS	
	61	14	03	REPORT NO. 3	DATE Mar. 1923

FIG. 68.—Inventory difference slip.

demands it, to inquire into the effectiveness of his methods of storekeeping and material accounting. After signing he then returns the slip to the ledger clerk from whom it originated. It is then entered in the material ledgers and the book balance brought into agreement with the actual count.

If, in addition to quantities, prices are carried on the ledgers the ledger clerk supplies the proper price and extention at the bottom of this form and makes his entry therefrom. All forms thus entered are held until the end of the month when they are

used to compile the monthly report of inventory adjustments which the Accounting Department requires for adjusting their "Material Controlling" accounts.

Should the Inventory Verification slip call attention to the unsatisfactory condition of the material it is then necessary for the ledger clerk to have the material examined by inspectors. The inspection division is notified by means of the Stores Inspec-

STORES INSPECTION REQUEST

LEDGER	PAGE	DATE	CLERK	SERIAL NO.
19	57	3/8/23	Holt	895

COMMODITY: Brace Strap (Leather)

SIZE: 3"x18"

PART NO.	LOCATION OF MATERIAL		
	BUILDING	DEPARTMENT	DEPT. STORAGE LOCATION
7005	71	17	B3C2

TO BE FILLED IN BY INSPECTOR

CONDITION OF MATERIAL	RECOMMENDATION	INSPECTOR
12 pcs. cracked Not fit for use	Should be scrapped In future straps should be soaped every 3 months	D. Hayes DATE 3/14/23

INSPECTOR MUST TAG EACH PART FOUND IN A DEFECTIVE CONDITION

J. Murphy
SUPT. OF MATERIAL

FIG. 69.—Stores inspection request.

tion Request. This form is made out by the ledger clerk and then transmitted to the superintendent of materials who in turn signs and forwards it to the chief inspector for action. It should be noted from the form that the reason for requesting an inspection of the material is not given. As a result the inspector is required to make thorough and independent examination. The results of the inspection and the inspector's recommendations are then recorded, and the form returned through the superintendent of materials to the ledger clerk.

Further action on the part of the ledger clerk is now dependent upon the findings and recommendation of the inspector. Should he report that the material is satisfactory, nothing further need be done. On the contrary, if he reports that the material is not satisfactory, that it should be scrapped, salvaged, or returned to the vendors (if they be at fault), it is necessary for the ledger clerk to order the material out of stores. This is accomplished by

MATERIAL RELEASE SLIP

LEDGER	PAGE	DATE	CLERK	SERIAL NO.
19	57	3/16/23	Holt	763

TO STOREKEEPER: M. Gibbons

LOCATION N- Dept. 17

DEFECTIVE COMMODITY:	SIZE	QUANTITY
Brace Strap (Leather)	3"x 18	12

PART NO.	LOCATION OF MATERIAL		
	BUILDING	DEPARTMENT	DEPT. STORAGE LOCATION
7005	N	17	B3C2

DELIVER ABOVE DEFECTIVE MATERIAL TO:	QUANTITY	DELIVERED FROM STORES DATE
SALVAGE DEPT.		3/20/23
SCRAP DEPT.	12	
INSPECTION DEPT.		STOREKEEPER
SHIPPING DEPT.		M. Gibbons
		SIGNED

DATE 3/17/23 — J. Murphy, SUPT. OF MATERIAL

MATERIAL LEDGER CLERK

POSTED	DATE
Holt	3/22/23

THIS SLIP TO BE CONSIDERED AS A REQUISITION AND HENCE SHALL BE RETURNED TO MATERIAL CONTROL DEPT. WITH ALL OTHER REQUISITIONS.

THIS SLIP IS INCLUDED IN REPORT OF ADJUSTMENTS FOR THE MONTH OF Mar. 1923

FIG. 70.—Material release slip.

a Material Release slip. This form is also originated by the ledger clerk. It is the authority for the storekeeper to deliver from stores certain of his materials to the place or places designated on the form.

The storekeeper must account for these slips in the same manner as the regular material requisitions, which, with the exception of adjustments, are the ledger clerk's only authority for posting decreases to the balance of material on hand.

Design of Verification Forms.—In passing, attention should be called to the design of the four forms mentioned above in connection with the detailed verification procedure. One item only is placed on each slip. Where there are a large number of material ledgers, the individual slips can be readily sorted according to the various ledgers, arranged by page number or material number under each ledger, and the work of posting performed more rapidly and advantageously than if the forms contain two or more items. It is not unusual to find the Inventory Verification form so designed that many items can be recorded on one sheet.

First, this type of a report if originating from the counters instead of from the ledgers, tends considerably to slow up the work of the ledger clerks for the reason that it must pass from one clerk to another, each using such information as is applicable to his own ledgers. On the other hand, if originating from the ledgers this type of form is generally prohibited by size from furnishing complete information, and again, the questioning of one item in the storeroom holds up all other items on the form.

As a means for facilitating the distribution of the verification forms, they may be printed on paper of different tints. Raw material forms on white; worked material on salmon; operating and maintenance supplies on green; or the same or different tints for any other classification in use.

Adjusting the General Ledger Controlling Accounts.—The method by which the ledger clerk makes adjustments to the sundry individual material accounts has been explained in connection with the Inventory Difference slips. The method by which these same adjustments are taken up in the general ledger controlling accounts will now be considered.

All Inventory Difference slips, once they have been posted by the ledger clerks, are held by them until the end of each month and then turned over to the chief in charge of the ledgers or to the superintendent of materials. The slips are then arranged according to their respective classifications, *i.e.*, by Raw Material Adjustments, Worked Material Adjustments, Operating and Maintenance Supplies Adjustments, etc. Slips under each classification are then arranged in a way considered best for future reference purposes. Everything is now ready for the monthly report to the Accounting Department.

This report is made on the Inventory Adjustment form. Each different slip is entered thereon and a record that it has been included is made in the lower right-hand corner of the slip itself. The report is then totaled, other required informa-

MONTHLY STATEMENT
INVENTORY ADJUSTMENT
To Accounting Department

VERIFICATION OF THE MATERIAL LEDGER BALANCES WITH ACTUAL COUNTS DURING THE PAST MONTH DISCLOSES THE FOLLOWING DIFFERENCES. YOU ARE AUTHORIZED TO MAKE THE FOLLOWING ADJUSTMENT TO THE CONTROLLING ACCOUNT INDICATED

REPORT NO. 3
MONTH March
YEAR 1923

CONTROLLING ACCOUNT NAME	NO.	ADJUSTMENT CR.	ADJUSTMENT DR.	AMOUNT
Raw Material	117	56 91	—	56 91

DETACH HERE AND FILE WITH JOURNAL VOUCHER MAKING ADJUSTMENT

THIS PART OF FORM TO BE FILED IN ACCOUNTING DEPT.

SHEET NO. 1
REPORT NO. 3
MONTH March
YEAR 1923

Controlling Account Name Raw Material
Controlling Account No. 117

ITEM	SERIAL NO.	DESCRIPTION	PART NO.	QUANTITY DIFF.	UNIT COST	AMOUNT
1	6780	Shaft Collar	8279	17	1 01	17 17
2	6781	Camshaft	8107	3	8 57	25 71
3	6782	Brace Strap	7005	23	61	14 03
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
24						
25						
26						
27						
28						
29						
30						

DENOTE ALL OVERAGES IN RED

TOTAL FOR SHEET 56 91

THIS SPACE FOR JOURNAL ENTRY NUMBER	APPROVED BY COMPTROLLER		APPROVED BY SUPT. OF MATERIALS	
	DATE		DATE	
589	4/6/23	O. M. Pratt	4/5/23	J. Murphy

FIG. 71.—Inventory adjustment form.

tion supplied, and when completed, signed by both the superintendent of materials and the comptroller (or treasurer). Three copies are usually made: the original for the Accounting Department; a copy for the General Manager; a copy for the Material Control Department.

It is to be noted that the original copy which goes to the Accounting Department is divided into two sections; the section above the perforated line is attached to, and is filed with, the journal voucher; and the lower section is filed in a loose-leaf binder. This arrangement makes for a less cumbersome journal voucher, the amount of which may be easily verified at any time by reference to the lower section filed in book form. Not only is reference between these two sections possible by means of the report number, but also by means of the journal voucher number in the lower left-hand corner of the detailed section.

It has been recommended previously that the paper of the different slips be of contrasting tints as a means for facilitating sorting and posting. Should this scheme be put into practice it is also well to adopt it in connection with the Inventory Adjustment forms. If the Inventory Difference slips for raw materials are printed on white paper the same color should be used with respect to the Inventory Adjustment form for raw materials; if salmon-tinted paper is used for Worked Material use the same color for the Worked Material Inventory Adjustment form. Adopting this simple but useful expedient will be the means of preventing considerable lost motion through errors in sorting and posting.

Inventory Taken from Material Ledgers.—Whether material ledgers have or have not the features of apportionment it is quite essential to remember in taking inventory from these ledgers that the quantity in all cases should be the quantity which is "*on hand*" and *not* the quantity "*available.*"

Organization for Taking the Continuous Inventory.—The number of employees engaged to make the physical verification of materials is dependent upon the kind and size of the concern, the variety and amount of materials, the methods of storage, and the duties required to be performed. In the small concern it is not unusual to find that one of the many duties of the storekeeper is that of making the physical check himself. In the medium-size concerns, which are possibly more representative of general practice than either the very smallest or very largest concerns, the inventory verification is generally performed by bin men or assistants to the storekeeper. The larger concerns, on the other hand, if they are to maintain dependability of the material ledgers, should carry out the scheme of division of labor and maintain a special inventory gang under the supervision of a

Classified Statement of Value of Material Received, Issued, and on Hand

_____ Store Month of _____ 192____

Class No.	CLASSIFICATION	On Hand Last Month (1)	RECEIVED DURING THE MONTH: 2 Purchases Invoices	3 Dept. Invoices	Total to Account for 4 (1+2+3)	ISSUED DURING THE MONTH: Bills Shown on Orders on Storekeeper 5	6 Dept. Invoices	7 Bills Collected	Total Cost of Issues 8 (5+6+7)	On Hand at Close of Month 9 (4−8)	ASSOCIATED SUPPLY COMPANY USE: Purchases from Selves 10	Costs Profit From Sales 11 (10−8)	Class No.
1	Auto, Motorcycle and Motor Truck Sup.												1
2	Belting, Canvas, Rubber, Rawhide, Etc.												2
3	Boilers, Drilling and Stationary and Parts												3
4	Bolts, Nuts, Washers, Lag Screws, Etc.												4
5	Brick, Lime, Cement, Coal and Coke, Etc.												5
6	Casing, 6⅝" and 6¾", All Weights												6
7	" 4½" and 5⅝" "												7
8	" 8⅝" "												8
	" Odd sizes 7⅝" to 15⅛" inc., All Weights												9
10	" 10" "												10
11	" 12" "												11
12	" 12⅛" "												12
31	Machinery, Dynamos, Compressors, Etc.												31
32	Material Charges—Unadjusted												32
33	Metals												33
34	Miscellaneous												34
35	Oils, Fuel, Lighting and Lubricating												35
36	Packing Engines and Pumps												36
37	Paints, Varnishes and Painters' Supplies												37
38	Pipe, Common Black and Galvanized												38
39	Pipe, Drill												39
40	Pipe, Line, All Sizes												40
41	Pumps, Oil: Sucker Rods and Parts												41
42	Pumps, Steam and Parts												42
43	Rig Irons and Parts, including Sand Reels												43
44	Rope, Manila and Hemp												44
45	Rope, Steel Wire												45
46	Rotary Drilling Machine and Parts												46
47	Scrap												47
48	Tanks, Oil and Water Separators, Etc.												48
49	Tools, Derrick and Parts												49
50	Tools, Drilling and Fishing												50
51	Tools, Hand and Machine												51
52	Tubes, Boiler												52
53	Tubing, Oil Well, All Sizes												53
	Valves, Angle, Check, Gate, Stop Cocks, Etc.												54
55	Wagons, Harness and Stable Supplies												55
56	Waste												56
57	Material in course of manufacture												57
	TOTAL												

Dated _____ 19? Correct _____ STOREKEEPER

FIG. 72.—Monthly inventory report form.

competent foreman. This gang, which may consist of four, five, or more men, should be accountable to the superintendent of materials and not to any storekeeper. As a result their check is an independent check and they can report conditions as they exist without fear of consequence which might occur if they were acting under the direction of the storekeeper.

CHAPTER XX

OPERATING THE MATERIAL LEDGERS—PRICES

While it is true that some concerns still operate their material ledgers which show inventory in terms of quantity only, the majority now show both quantity *and dollars*. Before proceeding farther it is of the utmost importance (especially from the standpoint of clearness in the subsequent paragraphs of this chapter) to explain the meanings of the various words used here in expressing the inventory of a material in terms of dollars.

Generally in the discussion of inventories so far as dollars are concerned, three particular words are employed. These three words are—"cost," "value" and "price." Sometimes they are correctly used; sometimes incorrectly. Unless the intended meaning of each of these words is known in advance many statements in a discussion appear to conflict, and the full effect of various explanations is lost. How each of these three words will be used here must first be explained.

Cost.—The word "cost" is used here as the measure of the amount of dollars and cents expended by a concern in acquiring or producing for use or sale, items of material, due consideration being given to all expenditures necessary to locate the material in the place where it is to be used or sold. In the case of raw materials, operating and maintenance supplies, and finished merchandise purchased, "cost" is the gross invoice amount less deductions for all trade discounts, to which net amount should be added all transportation and other direct charges. In the case of work-in-process, worked material, and finished merchandise produced, *cost* is the total of: (*a*) raw materialcon sumed; (*b*) direct labor; and (*c*) overhead; each of these three factors making up the total cost, accurately calculated and properly applied, and in accordance with the best and accepted practice.

Value.—The word "value" used in the following paragraphs expresses an individual or collective estimate, in dollars, of the worth to the particular concern of a certain material or unit of material. Such estimate of worth may be more than, equal to, or less than the actual cost.

Price.—The word "price" is used here to express in dollars, the cost, value, or selling amount of material or unit of material. In the following paragraphs the word "price" without qualifications will be used as seldom as possible. On the other hand, the term "pricing" will be used to some extent, and in order that there may be no misunderstanding, this word is used to express the operation of supplying a dollar-and-cents amount to a unit of material, be that amount cost, value, or other.

Prices on Material Ledgers—Advantages.—Among the many advantages which accrue as a result of carrying prices on material ledgers, the following are the most important:

1. A perpetual inventory in terms of dollars is afforded.
2. The material controlling accounts in the general or factory ledger can be properly supported.
3. A history of price changes is furnished.
4. More accurate costs (so far as material is concerned) are obtainable.
5. A record is available which furnishes the cost, either individually or collectively, of material committments, receipts, and consumptions.

1. Whereas a perpetual inventory showing quantities only may be quite satisfactory to the manufacturing division of a plant, it is *not* satisfactory to the Cost, Accounting, or Administrative Departments. Therefore, if each kind of material in the material ledgers carries unit prices in addition to quantities, a perpetual inventory both in quantity and dollars is available at any time.

2. Many concerns operating material ledgers which show quantities only, carry accounts in their general ledgers to which all material purchased is charged and to which all material consumed, is credited. These accounts (expressed in dollars only) are called controlling accounts although in cases of this kind they exercise practically no controlling feature whatsoever. A controlling account deserving of its name should necessarily act as control over a large number of individual accounts. If the material ledgers do not carry items of materials in terms of dollars, no control is obtainable by use of any account in the general ledger by whatever name it may be called. To support properly the figures in an inventory controlling account each individual account in the material ledgers must be shown in terms of dollars.

3. As the unit price of each addition of material is recorded in the material ledgers, and as the date also is given, a history of prices over any given period is available.

4. Requisitions on stores whether for raw materials, supplies, worked material, or finished merchandise, must be priced in order to furnish a charge amount to the proper account. The operation of pricing requisitions necessarily requires unit prices. Hence when material ledgers cannot be used to obtain such unit prices some other means must be used. Such *other means* are usually unsatisfactory from the standpoint of accuracy, and costs so established are generally not dependable. So far as material is concerned, accurate costs are dependent upon material ledgers which are the means of furnishing correct unit prices.

5. A properly operated material ledger furnishes at any time a picture of the complete movement cycle of each kind of material —ordering, purchasing, receiving, storing, and issuing. Where material ledgers show items of materials in terms of dollars it is possible to obtain the amount of dollars represented in any movement, be that movement of a certain day or period. For example, the cost of certain material received during the months of January, February, and March may be easily determined by referring to the proper material ledger account and totaling up all receipts during the periods in question.

Prices on Material Ledgers—Ordered.—In most cases the Ordered Section of the ledger form shows quantity only. Unless there is some special reason for doing so, there is no advantage in showing the material ordered in terms of dollars. To be sure most purchase orders show the cost of the material, for it is the best practice in purchasing never to allow a Purchase Order to be placed until the exact terms of purchase are ascertained and included on the order. With but few exceptions the price shown on the Purchase Order coincides with the price on the vendor's invoice. However, although the cost is thus readily available it is seldom found in the Ordered Section of the ledger forms.

UNIT PRICES—RECEIPTS

Raw Material.—The unit cost and total cost of each new receipt of raw material must always be posted to the material ledgers. In what section of the ledger form such information is to be placed depends upon the type of ledger form being used. If the form has not the features of apportionment, the cost of

new receipts of material is posted in the Received Section. If the form *has* the features of apportionment, posting is made to On Hand Section.

What constitutes cost of material so purchased? Surely it is quite essential that this question be satisfactorily answered if proper accounting of material is to be established. First of all, in the make-up of cost, is the invoice amount. This amount may be the cost of the material f.o.b. destination, or, as is the more general practice now, f.o.b. shipping point. In the latter case, transportation charges from shipping point to the destination point must be added to the invoice cost.

In arriving at the invoice cost of a material it is customary to deduct all trade discounts from the gross invoice figure and to use the net amount as cost. Cash discounts on the contrary are seldom taken into consideration in establishing unit costs. Such discounts are treated by most concerns as items of income rather than deductions from the cost of materials.

The means for securing the amount of transportation charges is the freight or express bill rendered by the common carrier. Where the freight bill or express bill pertains to the shipment of one kind or item of material no difficulty is experienced in including the charge with the invoice cost. This ideal situation, however, does not exist in all cases. In fact in many concerns very few freight bills are applicable to but one kind of material. Usually several kinds of material are received from a vendor in one shipment, with one freight or express bill to cover all. When such cases occur, the one amount of transportation expense must be apportioned and charged to the various materials on some fair basis. In some cases apportionments are made on the basis of weight; in others, on the basis of the amount of cost; in others on the weighted average of cost and weight; and many concerns use other bases distinctly applicable to their own peculiar conditions. A basis for distribution which theoretically appears to be the proper one to use is often unsatisfactory from a practical standpoint because of the prohibitive expense necessary to operate it properly.

To the invoice cost and the cost of transportation, whether by rail, boat, or truck, must be added the cost of duties, insurance, and all other direct charges. Included among the direct charges should be special tools or equipment, the cost of which (incurred by the vendor) must be absorbed by the purchaser.

For example, a Purchase Order calling for a certain number of crankshafts is placed with an outside concern. In addition to the quoted price, the purchaser must pay for special dies necessary to forge the crankshafts. As these dies will last only so long, their cost of manufacture must be absorbed in the cost of the crankshafts if correct material costs are to be obtained.

Various concerns have direct costs distinctly peculiar to their own types of business. Whatever they are, it is essential that proper consideration be given to them in order that the cost of material as shown on the ledgers may represent the actual cost.

When transportation charges and other direct costs are added to the invoice amount, care must be taken to see that such items are also charged to the proper general ledger inventory controlling account. Otherwise a serious discrepancy will arise between the controlling account and the material ledgers.

Effect of Material Claims on Unit Costs.—As stated in a previous chapter, it is customary to file a claim with the vendor of material when anyone of the following matters occur in connection with the purchase and receipt of goods:

1. Goods returned.
2. Damaged material.
3. Shortage.

Exactly how such claims affect the sundry accounts in the material ledgers, especially with respect to the unit cost and total cost, is dependent upon the accounting of claims. Either of the following may be the procedure adopted:

1. Invoices for materials purchased are entered on the material ledgers net, *i.e.*, the invoice figure less any claim for returns, damages, or shortages.

2. Invoices for material purchased are entered on the material ledgers gross, *i.e.*, without consideration for any claims at the time of entry.

In the first case, (1) due consideration is given to all claims before entry of an invoice quantity or amount in the material ledgers. Hence, no subsequent consideration need be given to claims in so far as the individual material accounts are concerned. There is one exception, however—the return of material once placed in stores and subsequently found imperfect. In this instance the material accounts are affected by a claim.

The second procedure, (2), works substantially as follows: All purchase invoices are treated the same so far as their use for the material ledger is concerned, *i.e.*, all invoices are entered gross, no consideration being given to claims applicable to certain invoices. When this has been accomplished all claim applications are then passed over the material ledgers and each account adjusted to the extent of the figures shown on the claim application pertaining to it. Under this method it is assumed that the entire claim amount will be satisfied by the vendor.

When the material accounts have been adjusted, it is necessary that the Inventory Controlling account be adjusted to the extent of the total of all claims, in order to maintain a proper control figure. The entry necessary to make the adjustment is usually a credit to the Inventory Controlling account and a debit to an account called Unsettled Claims. This last account remains on the books until cleared by the receipt of credit memorandums from the various vendors upon whom requests were made for claim allowances. Any balance to this account represents either or both of the following items:

a. Claims not yet accepted nor refused by the vendors.
b. Claims for which certain vendors refuse to grant credits.

For balance sheet purposes the balance remaining in the "Unsettled Claims" account may be used as a reduction of accounts payable, provided, of course, that there is a reasonable chance of receiving the credits claimed.

Operating and Maintenance Supplies.—Operating and maintenance supplies of which many companies carry a substantial inventory are acquired in the same manner as raw materials. Hence the comments made above concerning raw materials with respect to determining what constitutes actual cost and actual unit cost, also apply in the instance of operating and maintenance supplies.

Worked Material.—The medium used for posting the quantity and cost of worked material to the worked material ledgers is not the same medium as used for posting quantity and cost of raw material. In the latter case quantity comes from the receiving slip filled in the Receiving Department, and cost from invoices and supplemental papers. In the former case, about which the present discussion is concerned, the quantity is

posted from W. M. Received in Stores slips, and cost is obtained from the Cost Department's records.

So far as quantity is concerned no more difficulty is experienced in the instance of worked material than in the instance of raw material. Cost, on the contrary, while comparatively easy to determine for raw material, presents, in the case of worked material, many problems. To undertake to discuss all of such problems would require a treatise on the subject of cost accounting, and although the reader is referred to books on cost accounting for the purpose of obtaining rather exhaustive material on this subject, a few matters with respect to the three elements of cost will be briefly touched upon here.

Material—that is, direct material—is the first element of cost, and only such material as enters into and becomes a part of the finished part or product should be charged under this classification. In most instances the cost of direct material is easy to establish. Its accuracy is dependent upon two factors, namely, (*a*) the quantity of raw material used and, (*b*) the correctness of the unit cost used in pricing the material. Comments with respect to (*b*) will be found under the caption Unit Prices—On Hand and Issued, on page 432.

From the standpoint of material cost the item of scrap many times presents a problem not at all uniform in its solution. The following methods are those in most common use:

1. Charging the job, order, or process with the full requisition amount, with no consideration given to scrap.
2. Charging the job, order, or process with the full requisition amount less such amount applicable to scrap.

Under (1) above, the total amount of the requisition is charged as cost and any amount received from the sale of scrap is credited to an "Other Income" account. Should the scrap material be used in the manufacture of another product or by-product no charge for the scrap is made to such product or by-product. This method is generally used when the amount of scrap is too small to affect seriously the accuracy of the costs.

On the other hand, when the item of scrap is too important not to consider in the compilation of costs, method (2) above is used. Under this method the full amount of a requisition is charged as a material cost and this amount credited with the amount of scrap. Placing the correct unit price on scrap is many times a difficult problem, especially if the scrap is not

sold as such, but used in other products or by-products. Even though scrap may be sold instead of used it is not so easy as one would imagine to establish the credit to the gross material cost of a particular job or order. Scrap from many jobs and orders is usually combined and held until a sufficient quantity has been collected as will bring the best price. Therefore if a credit is to be given to each separate job or order the amount received from the sale must be apportioned on some fair basis. A discussion of the methods used to price scrap in cases where it is used for other products or by-products instead of for sale would require more space than can be allotted to it in a book of this nature. The reader is referred to the more up-to-date books on cost accounting.

Direct labor is the next element of cost of worked material, and only such labor as is expended on direct operations required to convert or change raw material or materials into a finished part or product should be charged as cost under this classification. Very seldom does the establishment of direct labor cost cause any considerable trouble. Its accuracy is dependent upon accurate time-keeping, and correct payroll distribution.

Overhead is the third element of cost. Exactly what should go to make up the amount of overhead to be distributed, and exactly what method should be used as a basis for making the distribution, no two persons seem to agree on. It *is* agreed, however, that overhead is an element of cost and should be taken in as such with respect to worked material. Generally the amount of overhead to be considered as a part of manufacturing cost is made up of the cost of operating and maintenance supplies consumed, the cost of indirect or non-productive labor expended, and the cost of services and certain fixed charges. The following charges should *not* be included in overhead distributable to worked material:

1. Administrative expense.
2. Selling expense.
3. Interest.
4. Abnormal factory overhead due to idle capacity.
5. Cost of excessive or abnormal spoilage.

The method to use in distributing, on a fair and equitable basis, the correct amount of manufacturing overhead to the various cost accounts applicable to worked material is a problem which

remains for individual solution. Each case must be considered by itself.

Proceeding on the assumption that the cost-finding methods are satisfactory and that accurate costs are obtained, the next matter for consideration deals with the problem of getting the unit costs of worked materials on the worked material ledgers. Naturally, while worked material is in the process of manufacture, costs with respect thereto are being collected on the cost ledgers in the cost department. The cost of raw material comes from the requisitions for raw material or a summary thereof; the direct labor comes from the payroll distribution to jobs, orders, or processes; and the overhead is reported monthly (generally calculated by multiplying the amount of direct labor by the established overhead rate).

When the work on a certain number of parts or quantity of material constituting a lot has been completed, and the worked material inspected and transferred to worked material stores, costs on the cost ledger applicable to such lot are completed and totaled. The total cost divided by the number of good parts finished gives the unit cost of each part in the lot.

It would be quite ideal if the cost of each lot of worked material and the unit cost of each part could be established at, or shortly after, the time the lot is transferred to worked material stores. Then it would be possible to price the W. M. Received in Stores slip with the actual cost. (It will be recalled that this form is the means for posting the receipts of worked material to the worked material ledgers.) This ideal condition, however, very seldom exists because the cost of a lot can only be determined some time after the material itself has gone into worked material stores. In fact in many instances worked material may pass in and out of stores before the actual cost of the material has been established.

Lacking the above ideal condition it then becomes necessary to devise some practical method whereby worked material, as it passes into stores, may be priced at a figure which approximates actual cost. By doing so, it is possible then, to post not only quantity from the W. M. Received in Stores slips to the worked material ledgers but also cost (approximate cost) to the same ledgers.

There are several methods used to accomplish the above. The names and explanations of the methods in most common use are:

1. *Prior Lot Cost Method.*—Under this method the unit cost established for the lot or order completed just prior to the present lot or order is used in pricing receipts of worked material into stores. This method works best where the lot quantity is large and lots are processed through infrequently. In fact there should not be more than one lot processed in each month if this method is to work out satisfactorily and in accordance with its intention.

2. *Last Cost Method.*—Under this method the unit cost of that lot on which costs have been most recently determined, is used. When two or more lots are processed during one month the lot on which costs have been most recently determined (as under this method) may be several lots removed from the lot passing into worked material stores for which a cost price is required.

3. *Advancing Average Method.*—By this method the unit cost is determined by the use or combination of the costs of several prior lots instead of but one. The weighted average unit cost, and not the average of unit costs by themselves, is employed under this method. If, for example, it is desired to cost Lot 12 the weighted average unit cost established by use of the costs and quantities of Lots 11, 10, and 9 may be used. Unit cost for Lot 13 will be established by use of Lots 12, 11, and 10 and so on. In this way the various lots used for obtaining the unit cost advance each time a new lot is completed.

4. *Actual Cost.*—When there is small possibility of the lot of worked material, for which a cost is needed, being issued from worked material stores before the cost department has completed the actual unit cost the latter may be used. In this case, quantity is entered on the worked material ledgers at the time the material enters stores, but the cost is entered at a later date on advice from the cost department.[1]

Standard Costs.—A development of recent years has been that of setting up standard costs and using them in lieu of either actual costs, or costs determined from past performances. Standard costs are costs determined in advance of actual costs, after consideration has been given to all so-called standard performances (not necessarily past performances) and all probable market increases or decreases. A standard cost is one which, it is estimated, should result if certain standards of performance are adhered to, and if the market prices for material and labor coincide with the predetermined estimates.

There is nothing radical about this method. If properly put into effect and maintained it should produce more satisfactory

[1] The methods described above with respect to establishing unit costs for worked material also apply to finished product.

results, under certain conditions, than any of the four methods described above, with the exception of the actual cost method. Under the other three methods unit costs are set up by utilizing past performances solely, with no consideration given to probable increases of cost resulting from market changes.

UNIT PRICES—ON HAND AND ISSUES

Raw Material Ledgers.—The total cost of the first receipt of a material divided by the quantity gives the first unit cost; and until a new quantity of the same material bearing a different unit cost is received the first unit cost so established may be used without question either for pricing stores requisitions or for inventory purposes. As a rule the unit cost of the second and subsequent receipts varies from the unit cost first established, with the result that the question arises as to what new unit cost figure is proper to use.

For example, let it be assumed that 100 bolts are purchased at a total cost of $5. The unit cost of each bolt is 5 cents. Let it be further assumed that 80 of the 100 bolts are requisitioned from stores. The requisition should be priced at the unit cost of 5 cents. Twenty bolts are now on hand. At this point 50 similar bolts are purchased at a total cost of $3.50, or a unit cost of 7 cents each. The material ledger would now show on hand 20 bolts purchased at a cost of $1, and in addition 50 bolts purchased at a cost of $3.50. If a requisition for 25 of these bolts came to the ledgers to be priced what unit cost figure should be used?

As the above example is representative of most practical cases (occasionally in special instances the problem may be a trifle more complex) and as there are several methods for establishing unit costs, the detail of these methods will now be explained.

There are three well-recognized methods of establishing unit costs where there has been more than one receipt of material—and the unit acquirement cost of each has been different. These three methods have the respective names of:

1. Arithmetical average method.
2. Weighted average method.
3. "First in, first out" method.

Arithmetical Average Method.—This method is the least employed of the three named above because through its use there is greater chance for serious error. Under this method a new arithmetical average is established each time a new delivery of material is received by adding to the average unit cost in use, the unit cost of the new material, and dividing by two. The new arithmetical average so established is then used as the new unit cost for pricing requisitions and inventory. To illustrate: Material purchased for the first time has a unit cost of 5 cents each. Before all of this material is consumed a second quantity is received. This second delivery cost is 6 cents per unit. The unit cost for pricing purposes is determined by adding 5 cents to 6 cents and dividing by two—or a new unit cost of 5.5 cents.

There is very little excuse for using this method. First of all, it will in most cases set up figures which are far from correct figures, and the general use of these are bound to result disastrously. Imagine the result of using the following as the unit cost:

	Quantity		Purchase Unit Cost	Total Cost
On hand	1	@	$.05	$ .05
New purchase	100	@	.03	3.00
			$.08	$3.05
Unit cost	.08 / 2	=	.04	

In certain special cases—in fact in only *very* special cases—may this method be used, and then only if conditions remain constant. Unless everything is ideal, the actual cost of the material may be overabsorbed by use of inaccurate unit costs long before the material itself is entirely issued from stores; or the actual cost may be underabsorbed and thus show a balance representing material, which physically has been totally consumed. This method is one which demands general condemnation.

Weighted Average Method.—Of the three methods explained here, this method is perhaps the one in most general use. Under this scheme the unit cost of the first receipt of material is used until a new receipt of material bearing a different unit cost is entered on the material ledger. The more common practice to establish a new unit cost is to add the new receipt of material, both quantity and total cost, to the quantity and cost respectively of the balance of stock then remaining on hand. By dividing the total of these two quantities into the total cost, a new unit cost is established for pricing and inventory purposes until another receipt of material changes the unit cost. Then another new unit cost is established, and so on. For example:

	Quantity	Purchase unit cost	Total cost	Average unit cost
First purchase	200	$2.00	$400	$2.00
Consumed	150	.....	300	2.00
Balance	50	.....	100	2.00
Second purchase	100	3.50	350	
New balance	150	.....	450	3.00
Consumed	75	.....	225	3.00
Balance	75	.....	$225	$3.00

It will be seen from these figures that the first unit cost is $2. This figure is used until the second purchase of material arrives. Due to the fact that the actual unit cost of this second purchase is $3.50 the new average weighted unit cost is $3. Under the first method discussed (the arithmetical average method) the unit cost would be $2.75. It will be also noted that but two factors are involved each time a new unit cost is established—the first factor is the balance on hand (quantity and amount), and the second factor is the new receipt of material (quantity and amount). The cost of these two factors (the first one is priced on the basis of an average unit cost, the second at actual cost) divided by the sum of the two quantities establishes a new unit cost which if applied to each item of the quantity on hand should completely absorb the total cost. However, this seldom happens for the reason that the quantity on hand decreases other material comes in to increase the quantity and to set up a new total cost which must be absorbed by the new balance on hand at the new average unit cost figure.

"First In, First Out" Method.—This method operates under the arbitrary assumption that material is used in the same order as received—that material first received must first be exhausted before the second receipt of material can be considered as available for issue. Under this scheme the unit cost of the first purchase remains in effect, so far as pricing requisitions or inventory is concerned, until the quantity acquired at the time of the first purchase is exhausted. At that time the unit cost of the second purchase of material goes into effect and remains so until its quantity in turn is exhausted. Then the unit cost of the third purchase is used. The process continues in this manner. To illustrate the above: The first purchase of a certain kind of material shows a quantity of 100 pieces at 50 cents each, and the second purchase of this same kind of material shows 200 pieces at 75 cents each. In

pricing requisitions, for example, the unit cost to be used will be 50 cents until 100 pieces have been issued from stores. For the next 200 pieces, the unit cost will be 75 cents. This method requires more attention than either of the other two for the reason that the material ledger clerks must always be alert to note when the quantity of each purchase becomes exhausted, in order that the unit cost of the next purchase may be used. This feature is one of the chief objections to this method. Another objection presents itself when it so happens that the quantity on a requisition is greater than the balance on the ledger applicable to the purchase whose unit cost is being used. In such a case the requisition quantity must be divided for pricing—the first part priced at the unit cost of one purchase quantity, and the second part priced at the unit cost of the next purchase quantity. The principal reasons for the adoption of this method are two: The obtaining of more accurate material costs in cost accounting; and its endorsement, so far as Federal taxes are concerned, by the Treasury Department.

Worked Material and Finished Product.—The three methods described above concerning the establishment of unit costs for pricing requisitions and inventory of raw materials, apply similarly in the case of both worked material and finished product. In addition they are also used in the instance of all operating and maintenance supplies.

Requisition Pricing.—Each requisition on stores, whichever one of the five classes it may be applicable to, must be priced in order that the proper inventory account may be credited, and the proper accounts receiving the benefit of the materials, debited. The accounts to be charged may be other inventory accounts, property accounts, expense accounts, or cost of sales accounts.

Unit costs to use in pricing requisitions may or may not be taken directly from the material ledgers. These costs may be determined by any one of several methods. The following are in most general use:

1. Arithmetical average method.
2. Weighted average method.
3. "First in, first out" method.

The operation of each of these methods has just been explained.

In performing the actual work of pricing requisitions, one or the other of the following schemes may be used:

1. Pricing requisitions directly from the material ledgers. This requires reference to the ledgers every time a requisition is to be priced.

2. Pricing requisitions from a card index or visible file. In this case the unit costs are secured for the card index from the ledger and thereafter such card index is utilized for pricing requisitions. Under this scheme the material ledger clerks must notify the person using the card index of all changes in prices.

It is difficult to say exactly which method is preferable. Many concerns use the first method and many concerns use the second method, and all are securing excellent results. Each method has its advantages and disadvantages. For example, the second method requires a set of additional records. Also, there is greater chance of error in recording and using the proper unit cost. Offsetting these, however, is the more rapid means of pricing afforded.

There is one caution in connection with method (2) which is deserving of comment. It is this: That care must be exercised to prevent a requisition being priced at the old unit cost when a new unit cost should be used. In establishing the new average unit cost the old balance of stock used in conjunction with the new receipt of material to establish the new unit cost, is supposed to be on hand—not withdrawn. However, should a requisition reach the pricing cards and be costed before notification of the new unit cost has been received from the material ledgers, the result will be either an under- or overabsorbing of the inventory cost on the ledgers. The cost accounts will be incorrect and the inventory will be incorrect.

Method (2) does not lend itself as readily in the instance of the "first in, first out" scheme, as in the instance of the other two. For the smaller concern, method (1) works to advantage.

Once requisitions have been priced the next operation is extending. This operation merely requires the multiplication of the quantity by the unit cost. Extensions, in many cases, can be accomplished more accurately and rapidly by the employment of tables which have been worked out to show the extension of each quantity at various prices. The incorrect pointing off by decimal points can be largely done away with by use of these tables. Errors made in pricing and extending requisitions are difficult to detect unless some means are employed for checking them. A requisition which has been incorrectly priced or incorrectly extended, unless corrected, will be used for making up the total credit to an inventory controlling account and also for posting to some material ledger account. Although the

figures in both instances are inaccurate no difference between the controlling account balance and a total of the balances of the individual material ledger accounts is evident.

Material Returned to Stores.—The method of accounting for material returned to stores has already been explained, at least so far as quantity is concerned. The form used for returning such material, it will be recalled, is the Material Returned to Stores form. This form, for accounting purposes, has just the opposite effect of a requisition. Whereas a requisition effects a credit to some inventory account and a debit to some other account, material returned to stores has just the opposite result.

The only question in connection with the return of material to stores is that of pricing. When material is originally issued the requisition applicable to such material is necessarily priced at the unit cost in effect at the time, but by the time the material is returned the unit price, due to a new receipt of material, may have increased or decreased. It may be asked what unit cost would be the correct one to use in pricing the material returned to stores.

Generally the unit cost to use is the unit cost in effect at the time the material is returned, provided, of course, that the material is as good as when originally issued. The reason for this procedure is that although the unit cost may have changed since the date of the original issue, the quantity returned is usually so small as to effect the accuracy of the accounting but little. And again, although the quantity may be large, the change from one unit cost to another is usually so slight as to make the resultant a neligible amount.

In some instances, however, the unit price in effect at the time the material was issued is also used upon its return to stores. Especially does this apply where the variation in unit costs is great (a condition which seldom occurs) and the quantity of material returned is large. When material is returned in a depreciated condition the price used must be an estimated price.

All returns of material to stores which are priced at amounts which differ from the unit costs in effect at the time of the return, effect to change the prevailing unit cost. These instances, however, are the exceptional ones.

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